Task 3.2

Quarterly Status Report # 4

for the project entitled

Dairy Best Available Technologies in the Okeechobee Basin

(SFWMD Contract No. C-11652)

Submitted by

SWET, Inc.

Soil and Water Engineering Technology, Inc.

In Association With

MOCK•ROOS

CH2M HILL

ENTEL

June 15, 2003

The SWET Team

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Introduction

This is the fourth quarterly status report for the Dairy Best Available Technologies (BAT) project. This report covers the period through March 31, 2003. The primary activities during this quarter have been completing the review process for the implementation plan, obtaining dairymen approval for construction, finalizing wetland construction permits issues, conducting routine monitoring, and analyzing the monitoring data. Table 1 shows the status of each individual task.

Monitoring Activities and Problems Encountered

Monitoring has continued successfully, but as noted in the previous status reports, flow measurement has been continued to be hampered by the lack of sensitivity of the velocity meters due to clear water. The filtering processing has been successful, but alternative filtering technique need to be investigated. District monitoring experts have agreed to work with the SWET team in reviewing these procedures. A work meeting will be scheduled in the near future.

Analysis of Flow and Water Quality Data

The flow and water quality data for the monitoring sites has been analyzed (see Appendix A). Site reference maps are provided in Appendix B. Table 2 provides a summary of the estimated flow and phosphorus loads from the sites through the end of the quarter. As previously noted, the estimated flow volumes are subject to error.

Flow has been recorded at all sites except for Site KREA 41, which had no flow during the period of record. The transducer at Site KREA 41 is approximately 2 feet below the overflow weir crest; the indicated small stages were never high enough to cause flow. Therefore, the one water quality sample collected at the site was from stagnant water.

The phosphorus data (FigureA27) are consistent with District data measured at the same locations. The phosphorus data are also presented on the flow plots Figures (A3 to A26) to show the sample compositing period and how the phosphorus concentrations relate to flow. Fecal coliform levels (Figure A28) are generally very low except for a few sites (note, site KREA 32B had a very high single spike) that have animal grazing around or just upstream of the site. At most of the sites, the level of total suspended solids (TSS) levels are low (Figure A29), but are similarly correlated with nearby animal grazing.

The equipment blanks analyzed as part of the quality assurance program were all below detectable limits, which indicate excellent field protocol. The results from all duplicate samples were within 4% of each other.

TABLE 1. STATUS REPORT
FOR
DAIRY BEST AVAILABLE TECHNOLOGIES PROJECT
March 31, 2003

TASK NO PHASE I	TASK / DELIVERABLES DESCRIPTION	SCHEDULED COMPLETION DATE	STATUS
1	**Development of Goals, Performance Measures and Potential Impacts**		
	1.1 Project Kick-Off Meeting	11/9/2000	Completed
	1.2 Devlop Draft Goals, Potential Impacts/Performance Measures and Evaluation Method	12/2/2000	Completed
	1.3 Conduct and Submit Literature/Data Search and Summary	1/2/2001	Completed
	1.4 Submit Final Goals, Potential Impacts/Performance Measure and Evaluation Method	2/2/2001	Completed
2	**Assessment and Selection of Project Sites**		
	2.1 Ranking and Selection of Dairy Sites	2/2/2001	Completed
	2.2 Development of Landowner Agreements	4/2/2001	Completed
	2.3 Develop and Submit Draft QAPP and Monitoring Plans	6/2/2001	Completed
	2.4 Formulate Technology Alternatives and Submit Draft Report	6/2/2001	Completed
	2.5 Finalize and Submit Final QAPP and Monitoring Plans for Existing Dairy Conditions	8/2/2001	Completed
	2.6 Finalize Technology Alternatives and Submit Final Report	8/2/2001	Completed
	2.7 Complete Evaluation of Alternatives and Submit Draft Report	9/2/2001	Completed
	2.8 Develop and Submit Draft CNMPs for the Three Selected Dairies	10/2/2001	Completed
	2.9 Prepare for and Conduct One Stakeholders Meeting	10/2/2001	Completed
	2.10 Finalize the Evaluation of Alternatives and Submit Final Report	11/2/2001	Completed
	2.11 Finalize the CNMPs for the Three Selected Dairies and Submit Final Report	11/2/2001	Completed
	2.12 Governing Board Presentation	11/2/2001	Completed
	STOP/GO DECISION POINT for Phase II		
PHASE II	(Requires Governing Board Approval)		
3	**Implementation and Monitoring of Alternatives**		
	3.1 Farm Level P Load Monitoring		
	3.1.1 Equipment purchase (up to a total of 9 sites)	11/2/2001	Completed
	3.1.2 Install and Test Monitoring Stations (9 stations assumed)	11/2/2001	Completed
	3.1.3 Conduct Routine Field Monitoring Activities - TP (52 Biweekly trips from RPB)	Starting 11/2/2001	Started 5/1/02
	3.1.4 Laboratory Analyses (assume 9 biweekly samples for 52 trips TP @$15/sam.)*	Starting 1/2/2002	Started 5/1/02
	3.1.5 Labor & Lab for 9 monthly samples for 24 mo. Fecal and TSS @ $45/sample *	Starting 1/2/2002	Started June, 2002
	3.2 Preparation and Submittal of Quarterly Reports	Starting 11/2/2001	Forth Quarterly Report
	3.3 Develop Draft Vendor Project Documents, including bid specifications and agreements	1/2/2002	Completed
	3.4 Finalize Vendor Project Documents	3/2/2002	Completed
	3.5 Develop and Submit Draft Implementation Plan for Selected Technologies	3/2/2002	Completed
	3.6 Development of the Draft Monitoring Plan for Selected Technologies	3/2/2002	Completed
	3.7 Development of the Final Implementation Plan for Selected Technologies	5/2/2002	Completed
	3.71 Cost of Implementing Vendor Technology (prepare & review bids)	Starting 5/2/2002	Completed
	3.72 Review and Inspect Vendor Contruction Activities	Starting 5/2/2002	To be scheduled
	3.7.3 Vendor Payments	Starting 5/2/2002	In Process
	3.8 Develop and Submit Final Monitoring Plan for Selected Technologies	Starting 5/2/2002	In Process
	3.8.1 Equipment Purchase (up to a total of 6 sites)	6/2/2002	Completed
	3.8.2 Install and Test Monitoring Stations (Assumed 6 additional stations)	6/2/2002	To be scheduled
	3.8.3 Conduct Routine Monitoring Activities - TP (34 Biweekly trips from RPB)	Starting 8/2/2002	To be scheduled
	3.8.4 Laboratory Analyses (assume 6 TP samples @ $15/sample)*	Starting 8/2/2002	To be scheduled
	3.9 Prepare for and Attend Bi-annual Site Meeting (5 qtrs)	Starting 8/2/2002	To be scheduled
	3.10 Prepare for and Conduct Public Workshop	11/2/2002	To be scheduled
	3.11 Submit Workshop Minutes	12/2/2002	To be scheduled
4	**Evaluation of Alternatives Perforance**		
	4.1 Prepare and Submit Draft Final Report	9/2/2003	To be scheduled
	4.2 Prepare for and Conduct Public Workshop	10/2/2003	To be scheduled
	4.3 Prepare and Submit Final Report and Associated Project Data	11/2/2003	To be scheduled
	4.4 Prepare and Submit Workshop Minutes	11/2/2003	To be scheduled

Table 2. Summary of Flow and P Concentration Data for Dairy BAT Monitoring Sites (Through March 2003)

Dairy Name	Davie Dairy			Butler Oak Dairy				Dry Lake Dairy	
Site Name	Davie South	Davie North	Davie East	KREA 41	KREA 41A	KREA41B	KREA10D	KREA 32B	KREA 49A
Volume (ac-in)	10682	1331	5480	0	9234	92	3631	899	1088
Runoff (in)	6.75	4.11	16.91	0.00	4.31	1.13	1.99	2.33	3.63
Area (ac)	1583	324	324	0	2141	81	1821	386	300
P load (lbs)	3258	1037	422	0	2216	157	769	645	1170
Flow Avg P (ppm)	1.35	3.44	0.34	4.48	1.06	7.57	0.93	3.16	4.74

Vendor and Construction Progress

The vendors had completed their 100% designs for the three dairies during the prior quarter and were a waiting approval to move into the construction phase during most of this quarter. The primary activity during the quarter was finalizing the implementation plan and obtaining approval from the dairymen to move into the construction phase. To address questions raised by the dairymen, a special TRT meeting was held on February 25, 2003. A summary of this meeting is provided in Appendix C. The primary areas of concern were potential permitting and NRCS program eligibility problems down the road. The implementation plan was revised based on comments received and letter from FDEP included that addressed the alum permit questions. A letter was also requested from NRCS regarding potential impacts on their programs. Larry Sharp, NRCS DC for Highlands County provided direct assurances to Butler Oaks dairy, while J. Scott Kuipers, NRCS DC for Okeechobee County, indicated that he would have to complete wetland surveys prior to providing such a letter. This letter was not received by the end of the quarter.

Based on the revised implementation plan and assurances from NRCS, Butler Oaks Dairy approved the start of construction on March 19, 2003. Approval from the other two dairies was not received by the end of the quarter, but is anticipated to be received during April, 2003. The vendors and their contractors were ready to start construction as soon as approvals from the dairymen and District are received.

A summary of the costs by the vendors to date is provided in Table 3. MWBE forms have been submitted as required. All of the costs have been for surveying, environmental assessments, and engineering. These activities have been completed, and therefore the remainder of the vendor budget will be for construction activities. Construction is expected to begin by mid April 2003 and is scheduled to be completed by July 30, 2003. Table 4 provides an adjusted project schedule.

Table 3. Invoiced Expenditures for Vendors through March 15, 2003

Vendor Name	Percentage Completion	Invoiced through March 15, 2003
Engineering & Water Resources, Inc.	20	$116,531.72
CDM	26	$151,309.71
Environmental Research & Design	18	$104,882.22
Total	22	$372,723.65

Table 4. EOF Implementation Schedule

Tasks	Schedule 2003						
	Jan	Feb	Mar	Apr	May	June	July
Construction approval							
Construction permits obtained							
Final construction drawings							
Start of construction							
Construction							
Substantial completion							
Completion of construction							
Monitoring plan and installation							
Monitoring started							

Permitting Issues

All necessary permits have been received for the project. The Army Corps of Engineers (ACOE) permits for construction in wetlands for Dry Lake and Davie Dairies have been received. The permit for moving the gopher tortoises on Butler Oaks Dairy expired during the last quarter and was resubmitted with a new field survey. The renewed permit was received and the process of moving the tortoises was started in late March. The tortoises will be relocated prior to the start of construction.

APPENDIX A

FLOW AND WATER QUALITY DATA FOR MONITORING SITES

List of Figure

Figure A-1. Davie North - Stage

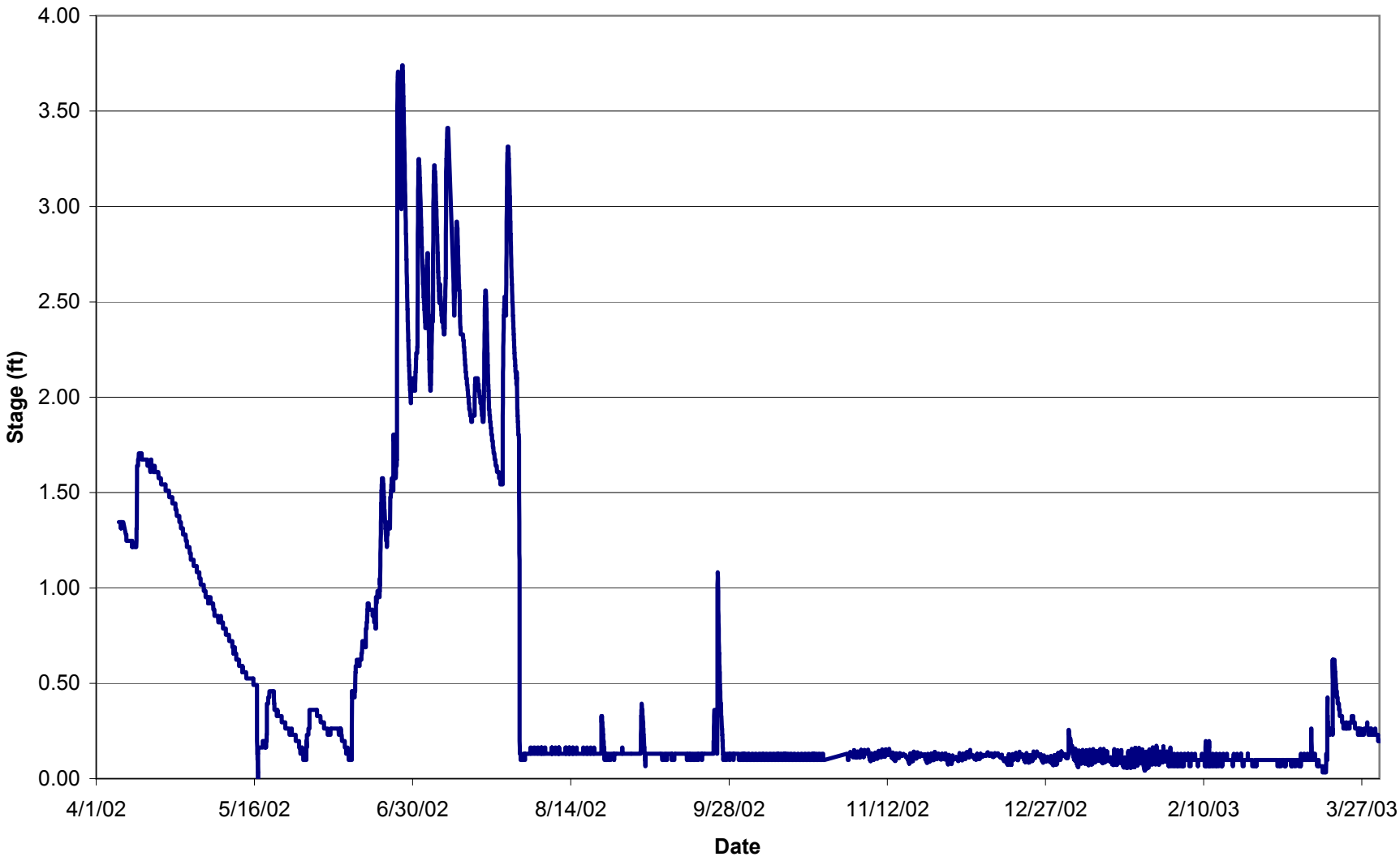


Figure A-2. Davie North - Velocity

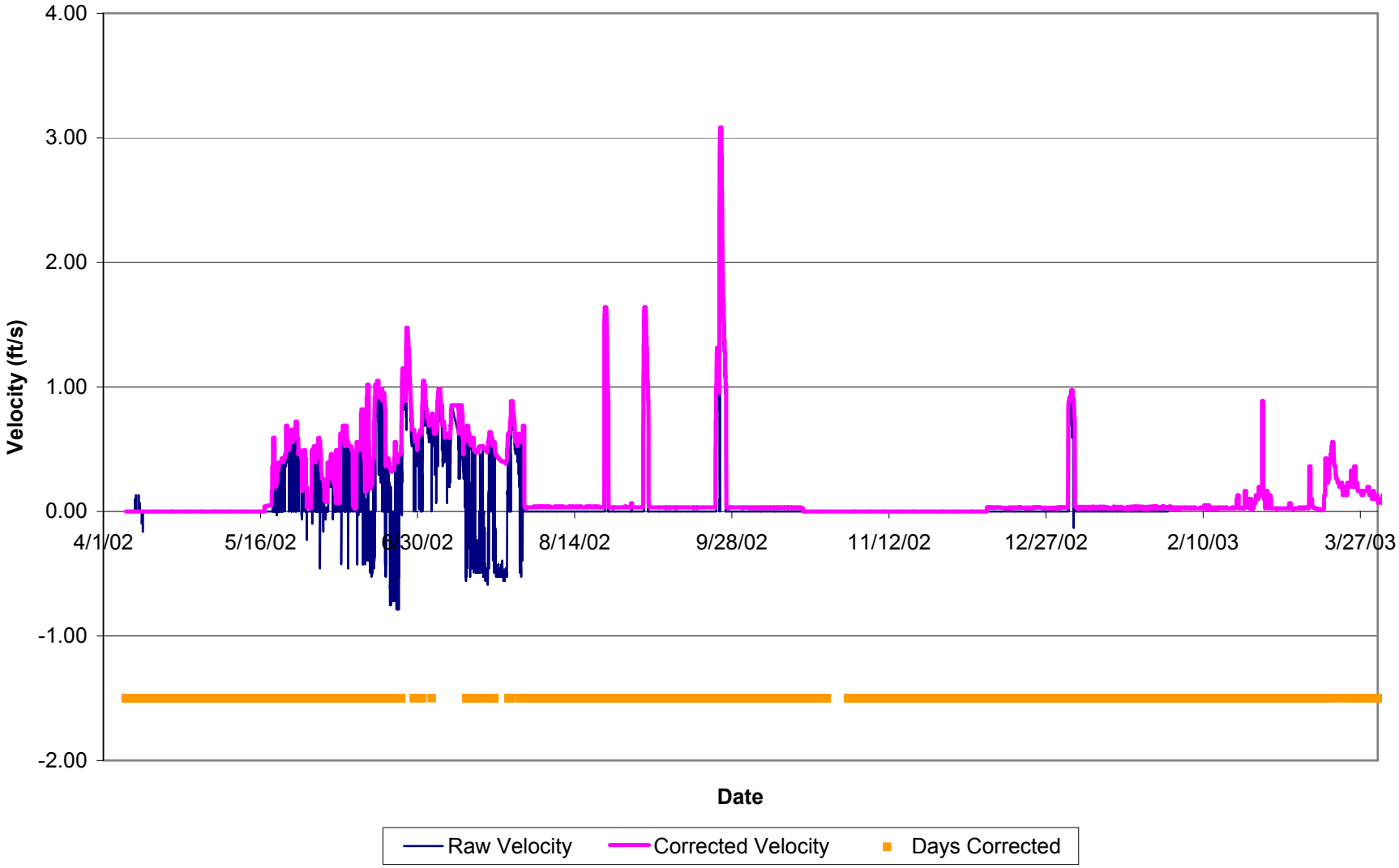


Figure A-3. Davie North - Flow and P Concentration

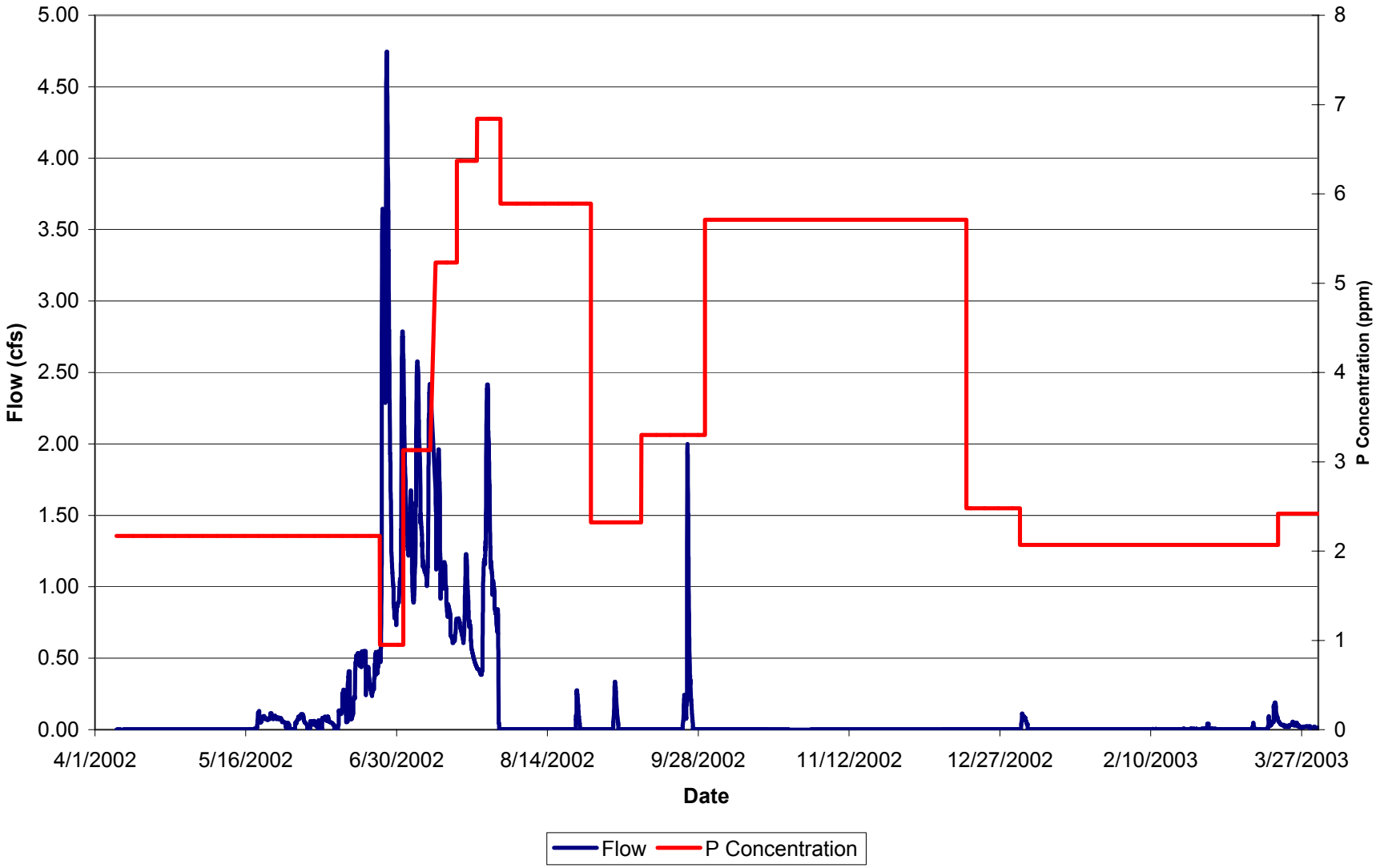


Figure A-4. Davie East - Stage

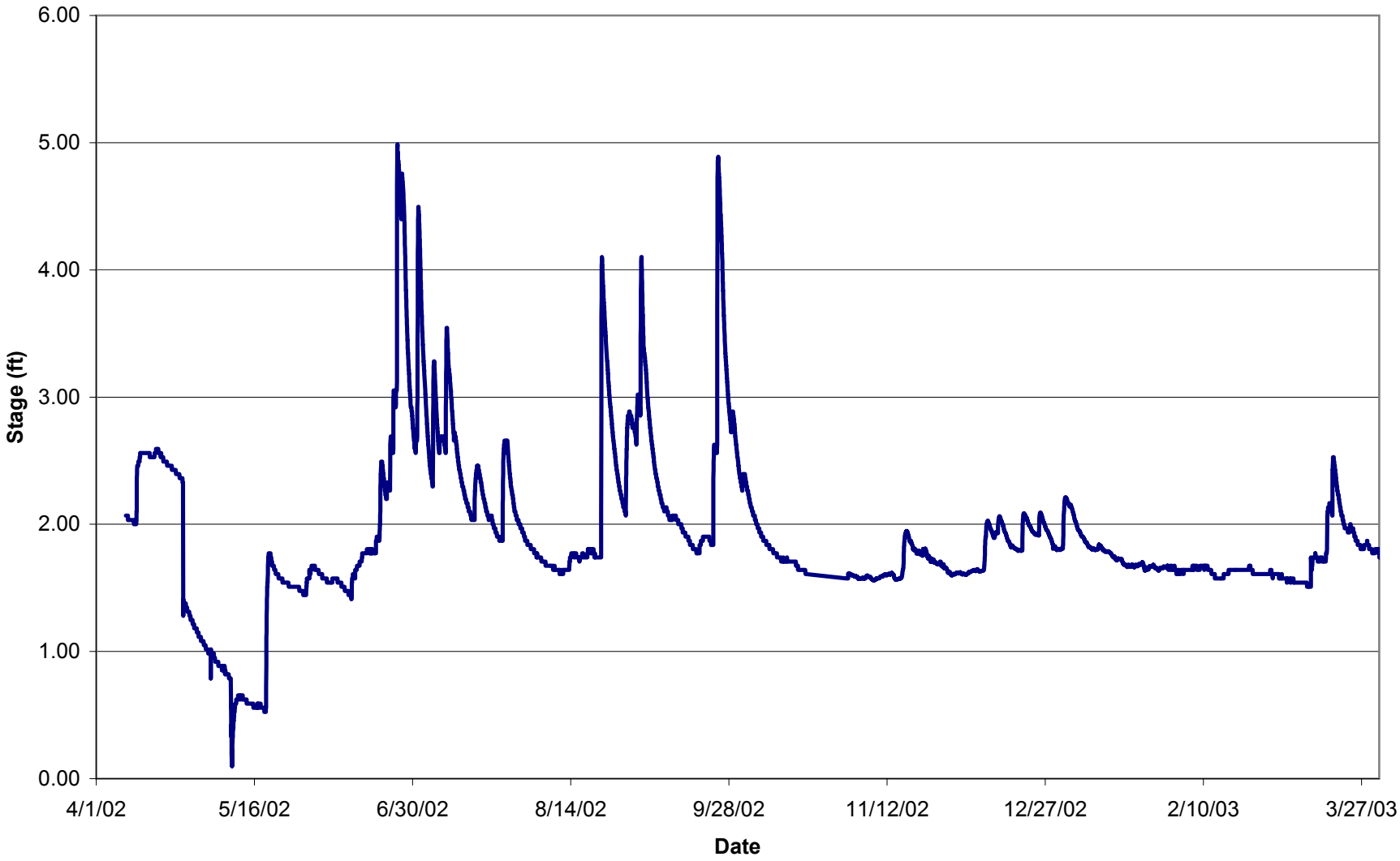


Figure A-5. Davie East - Velocity

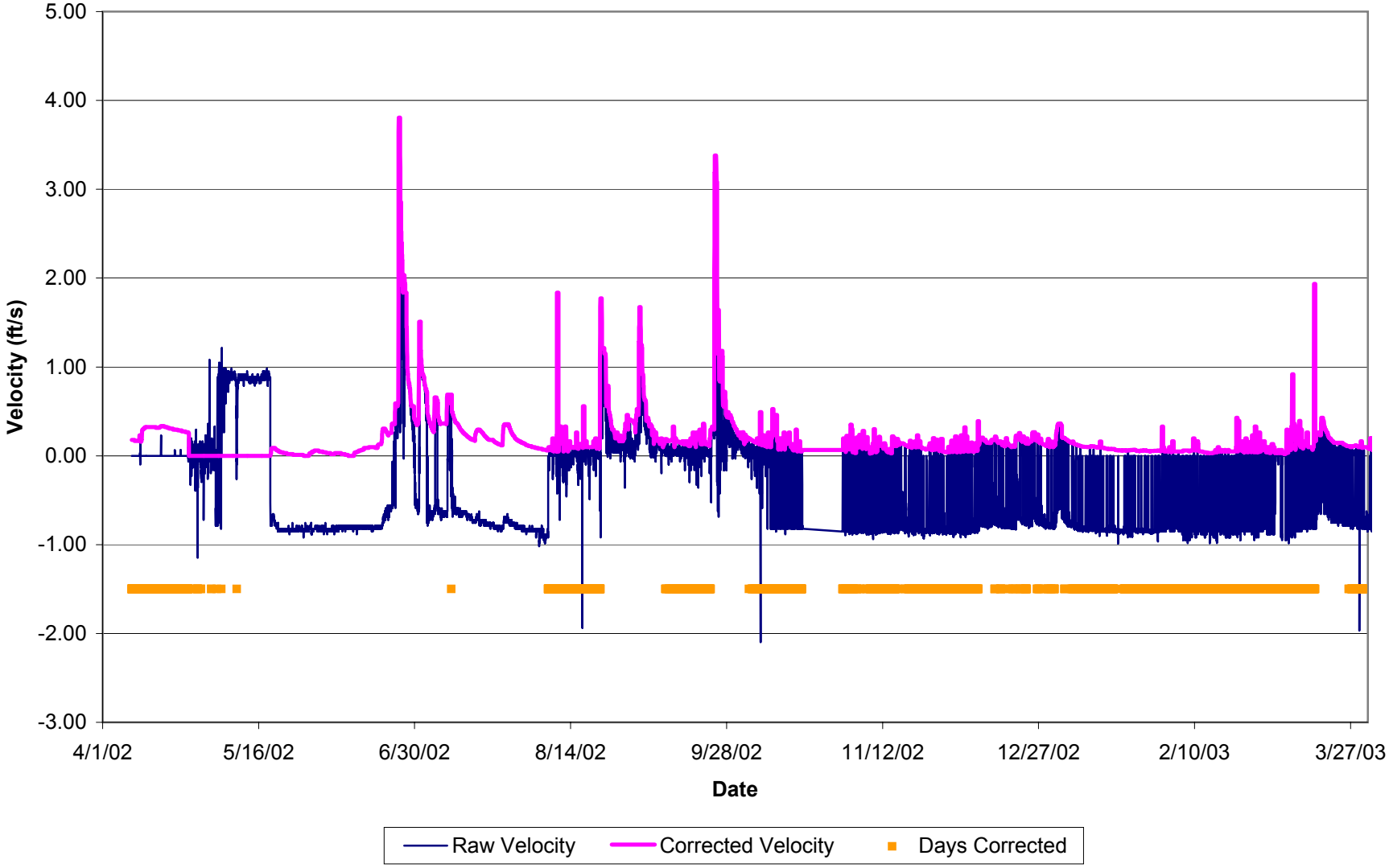


Figure A-6. Davie East - Flow and P Concentration

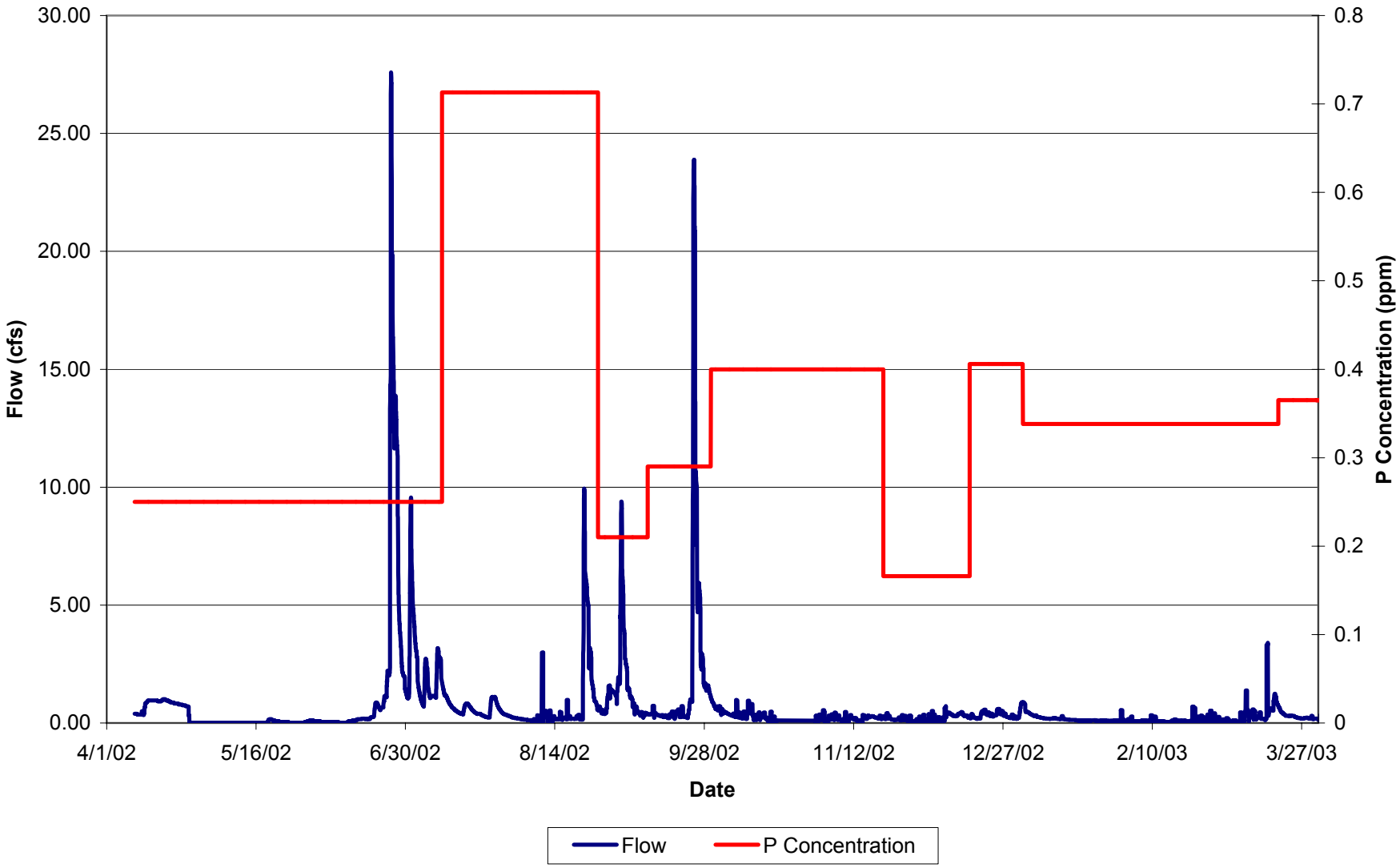


Figure A-7. Davie South - Stage

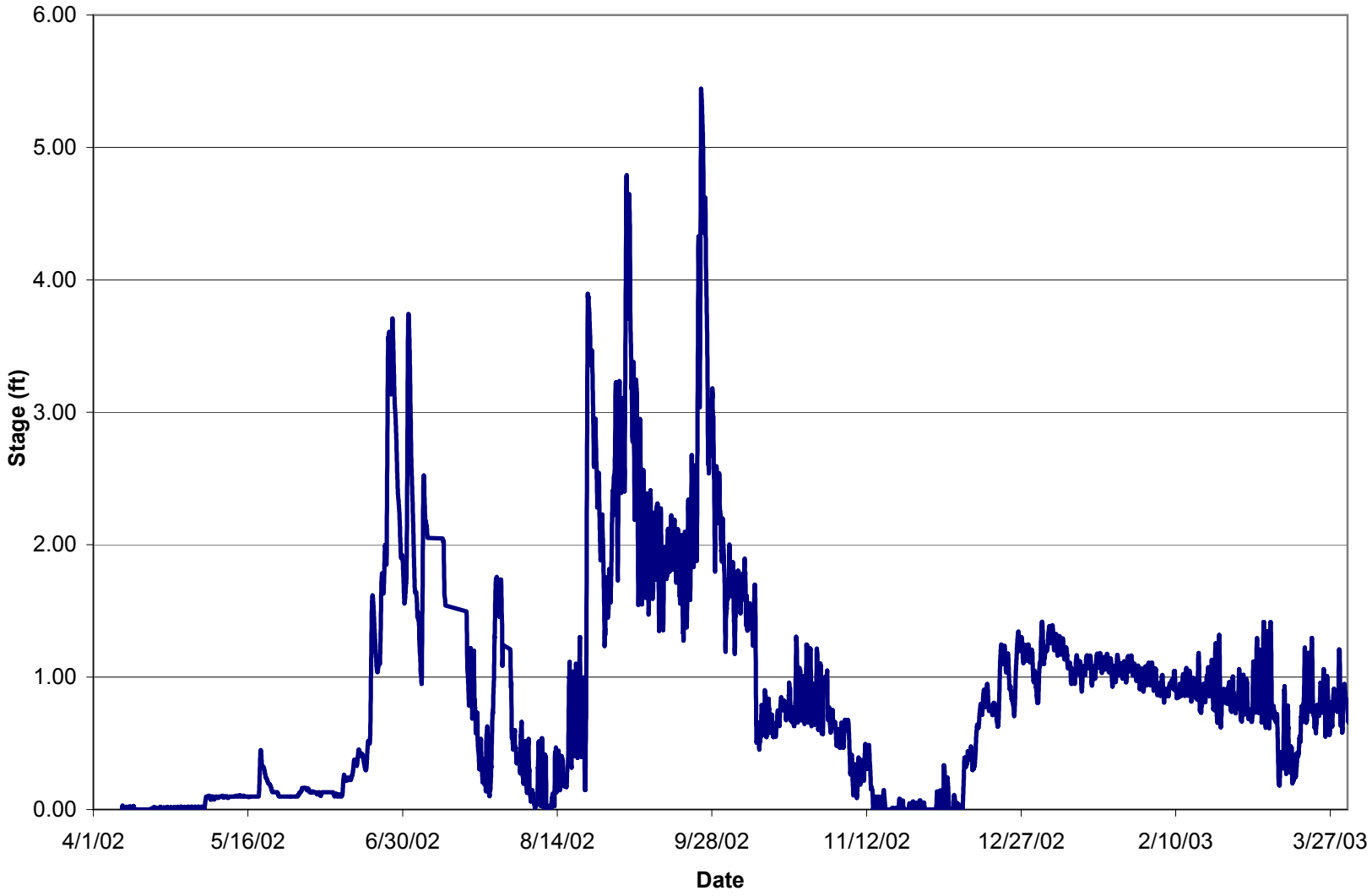


Figure A-8. Davie South - Velocity

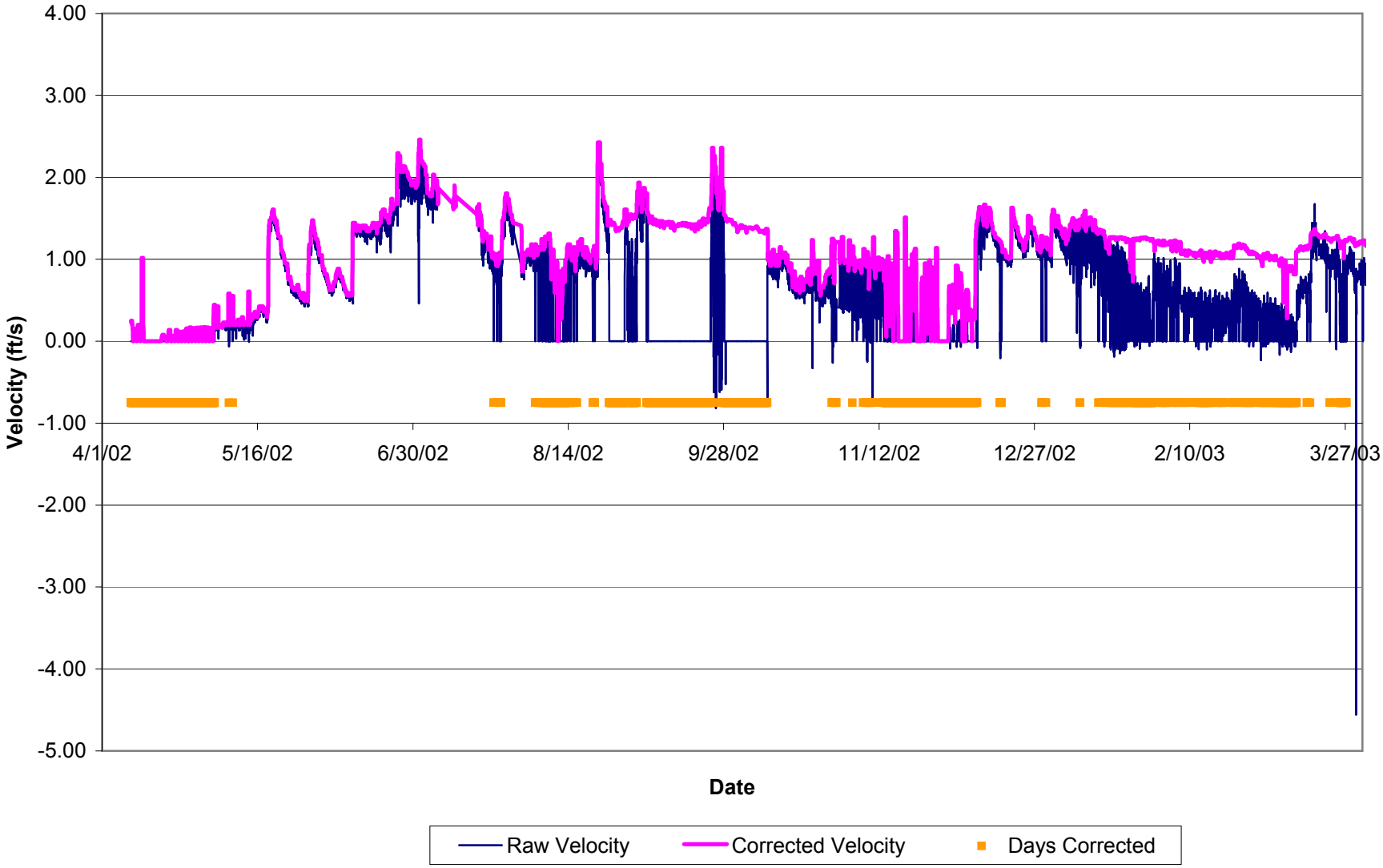


Figure A-9. Davie South - Flow and P Concentration

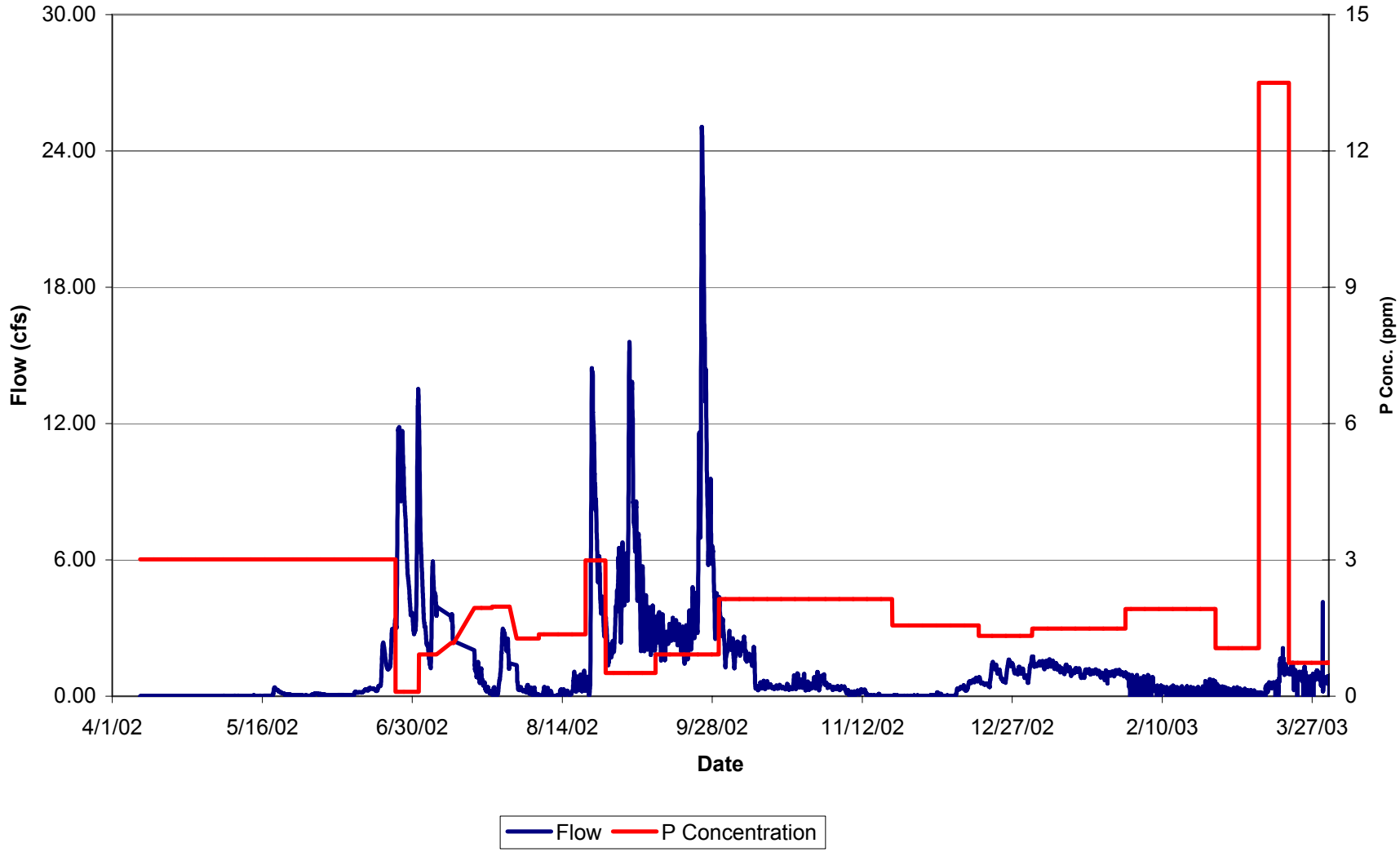


Figure A-10. KREA 41 - Stage

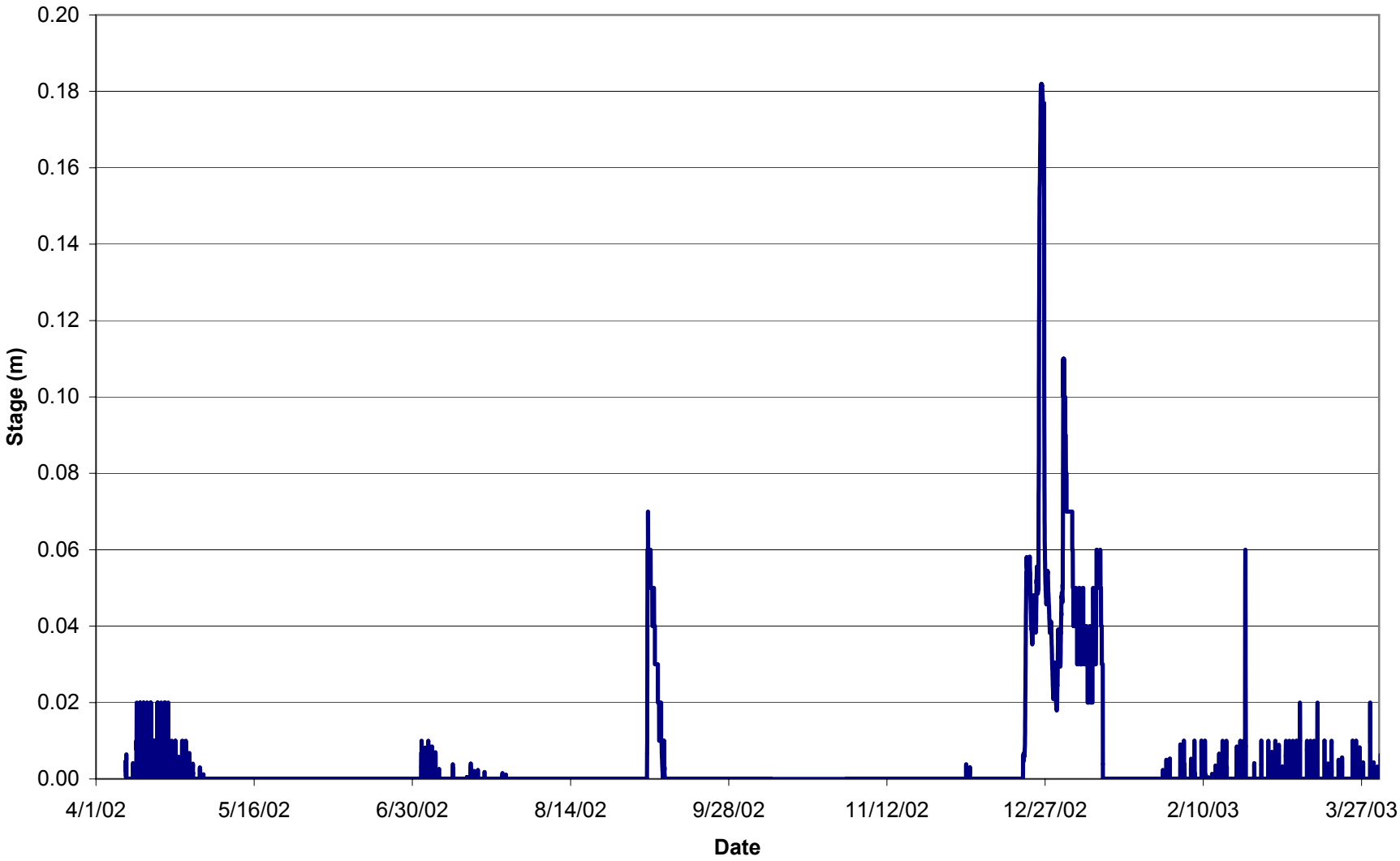


Figure A-11. KREA 41 - Velocity

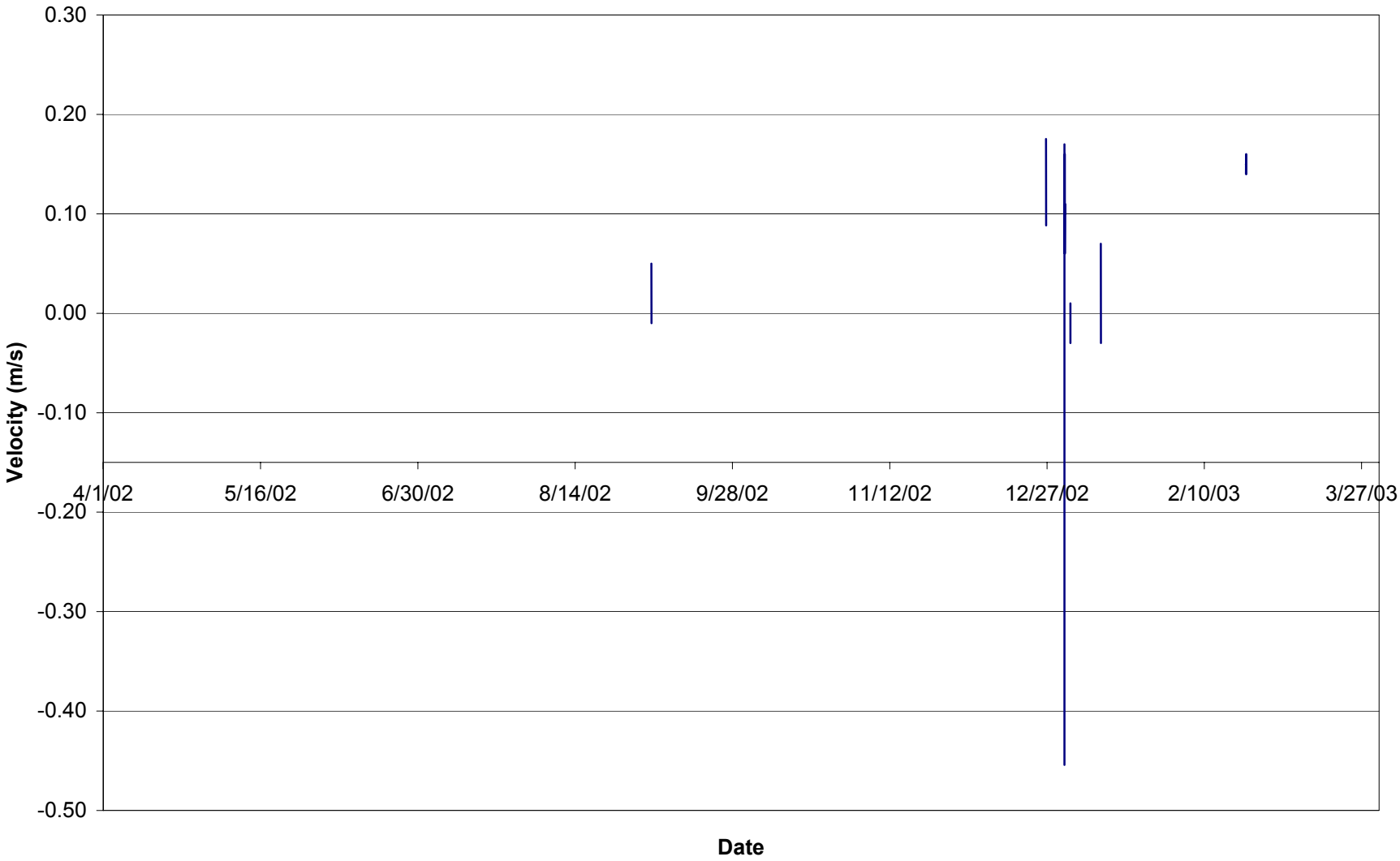


Figure A-12. KREA 41A - Stage

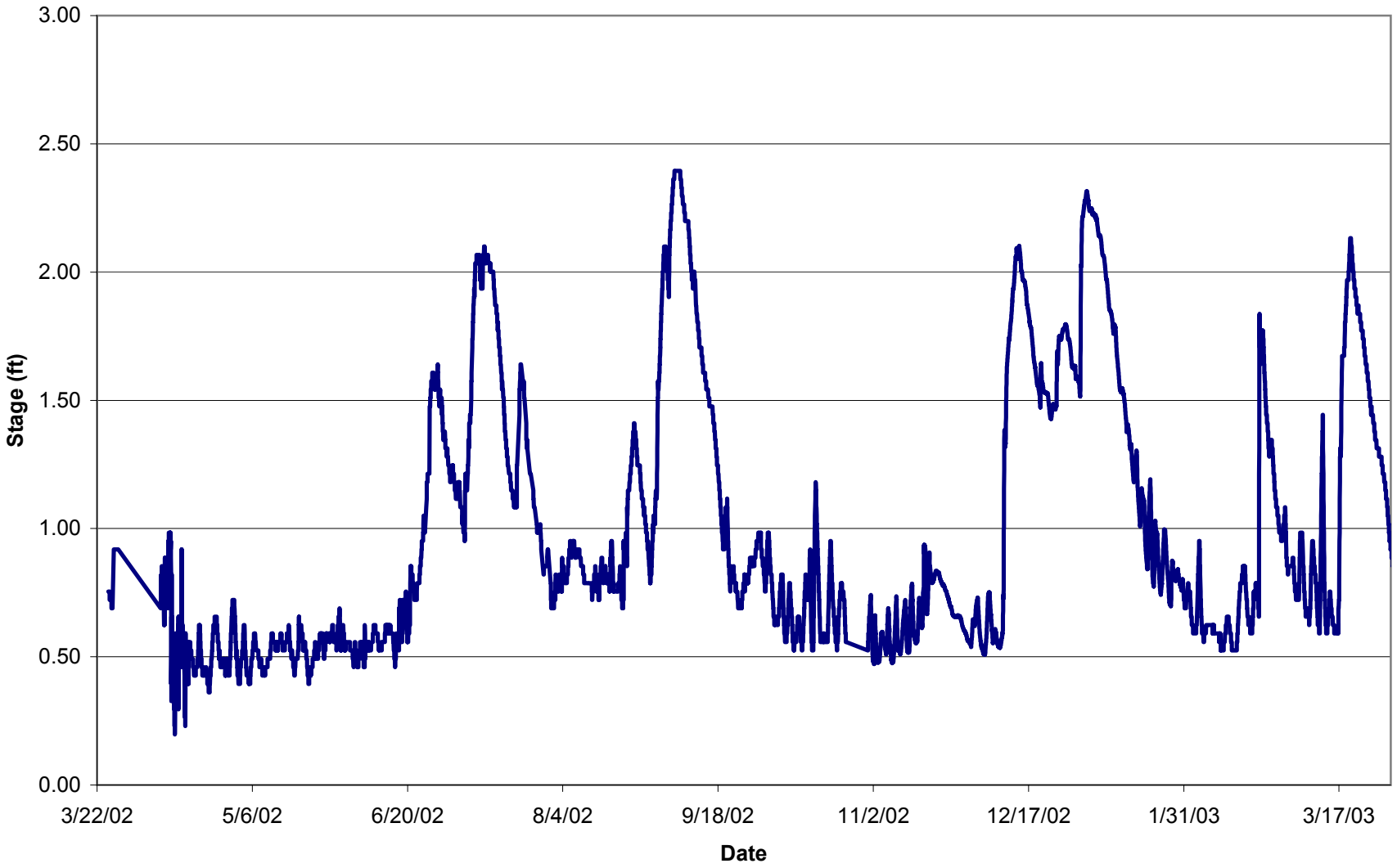


Figure A-13. KREA 41A - Velocity

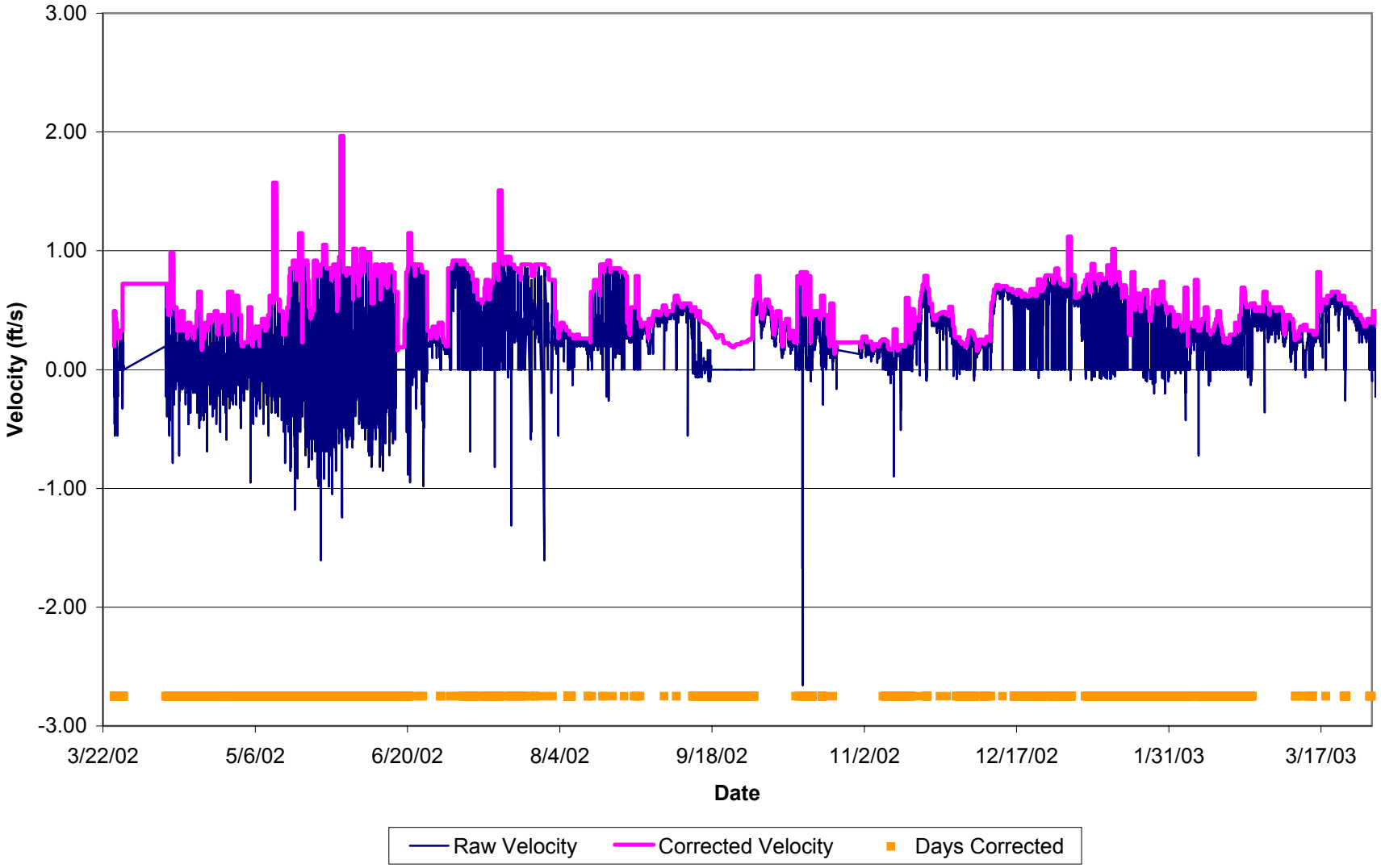


Figure A-14. KREA 41A - Flow and P Concentration

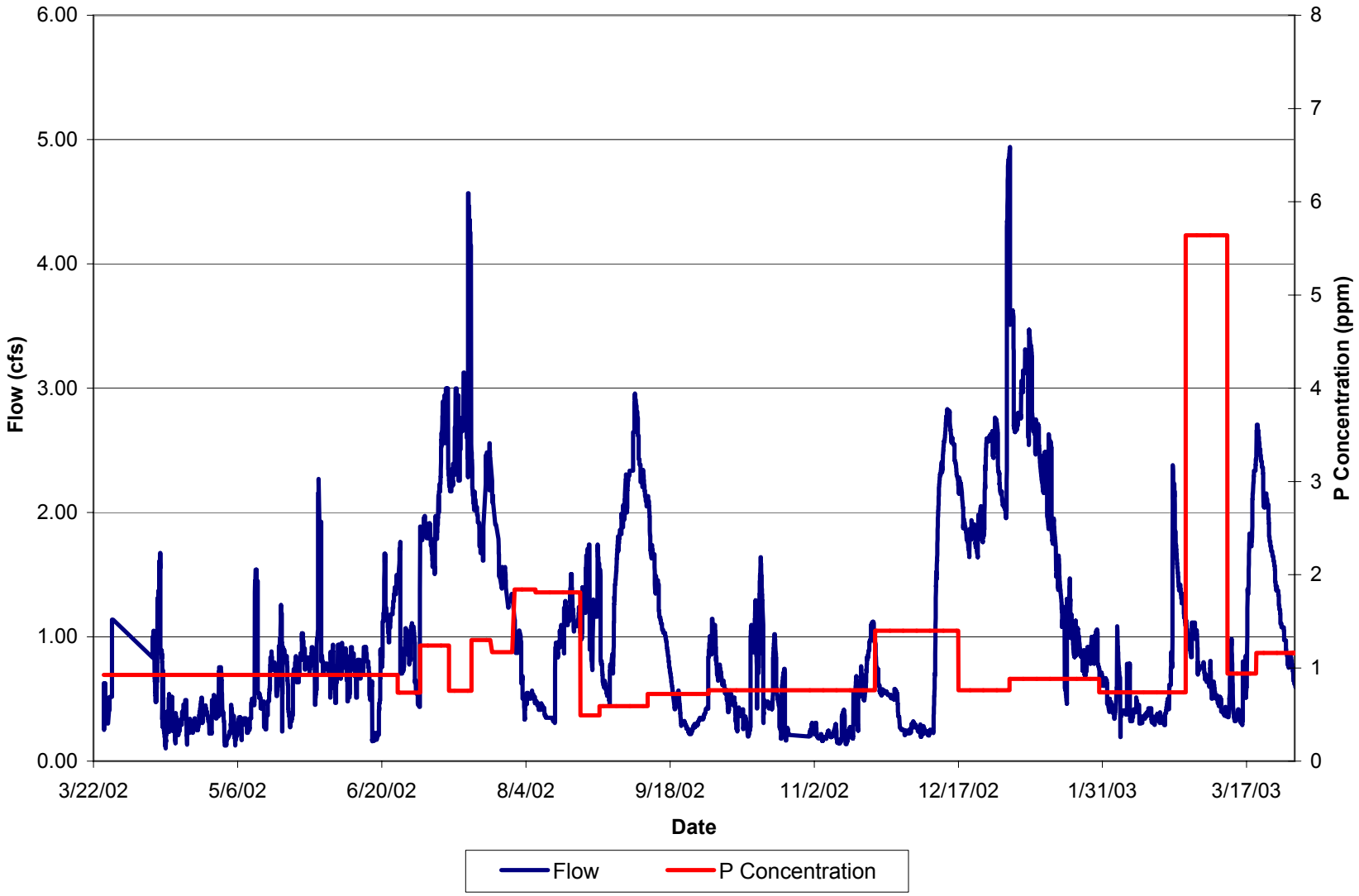


Figure A-15. KREA 41B - Stage

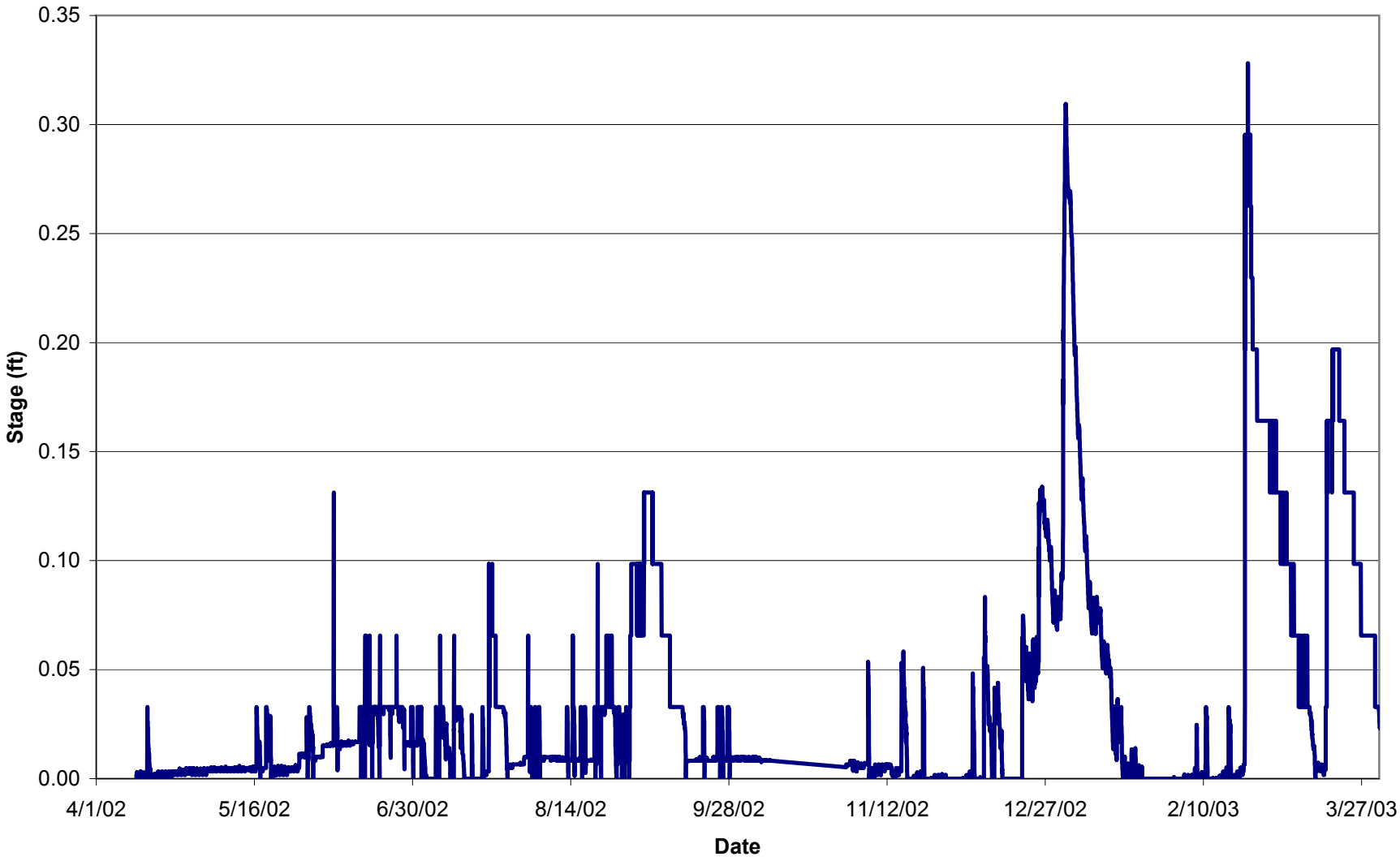


Figure A-16. KREA 41B - Velocity

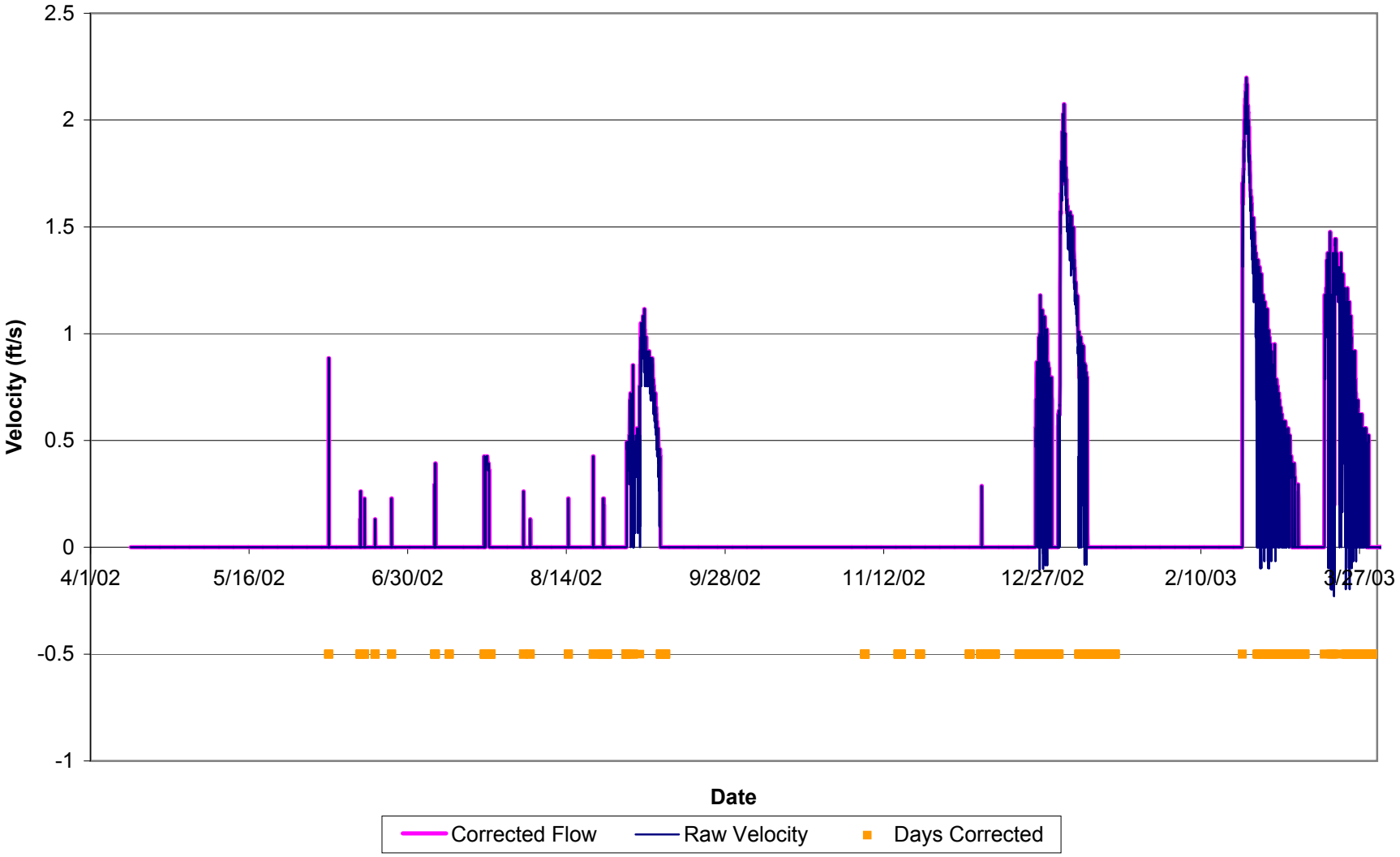


Figure A-17. KREA 41B - Flow and P Concentration

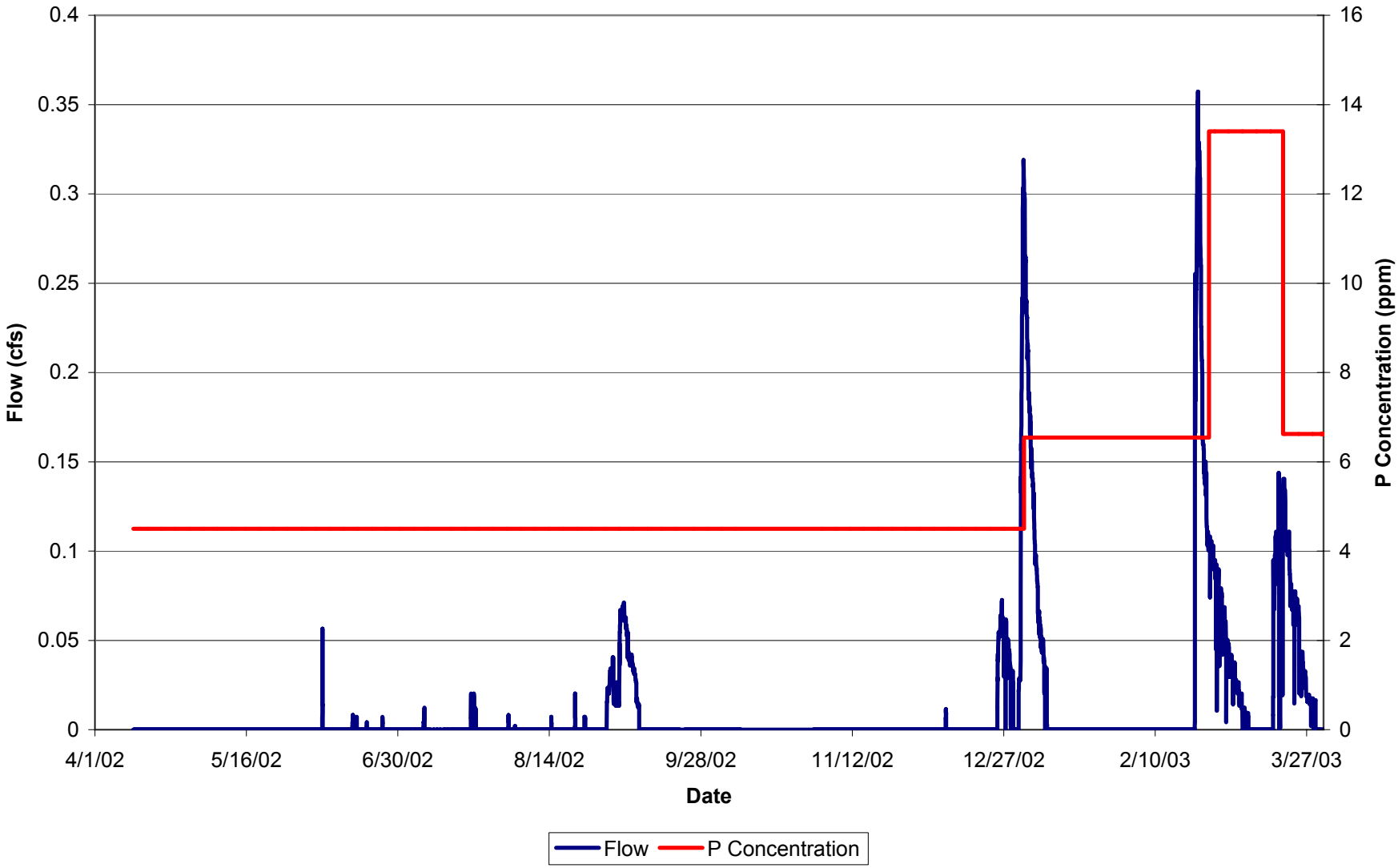


Figure A-18. KREA 10D - Stage

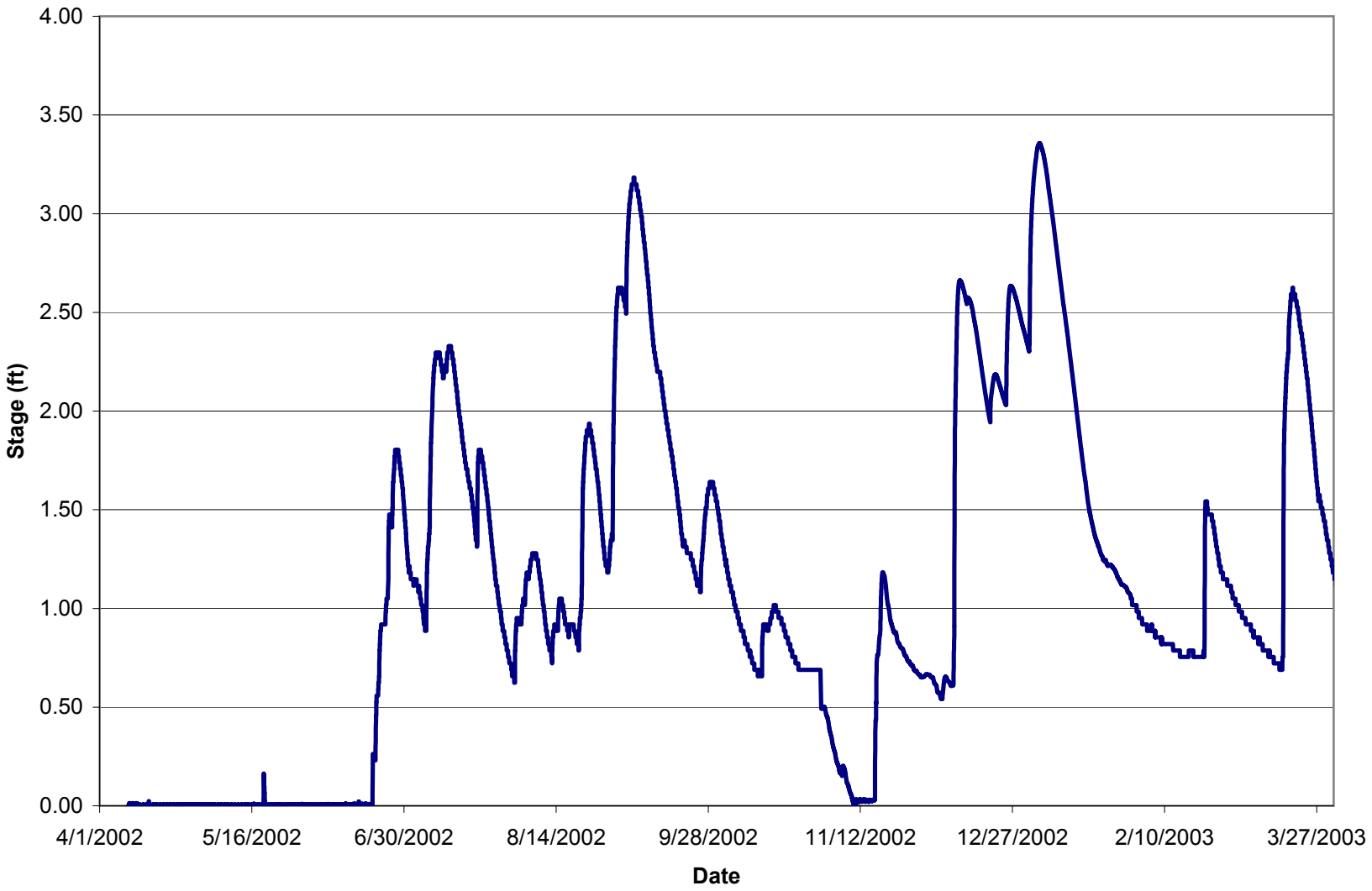


Figure A-19. KREA 10D - Velocity

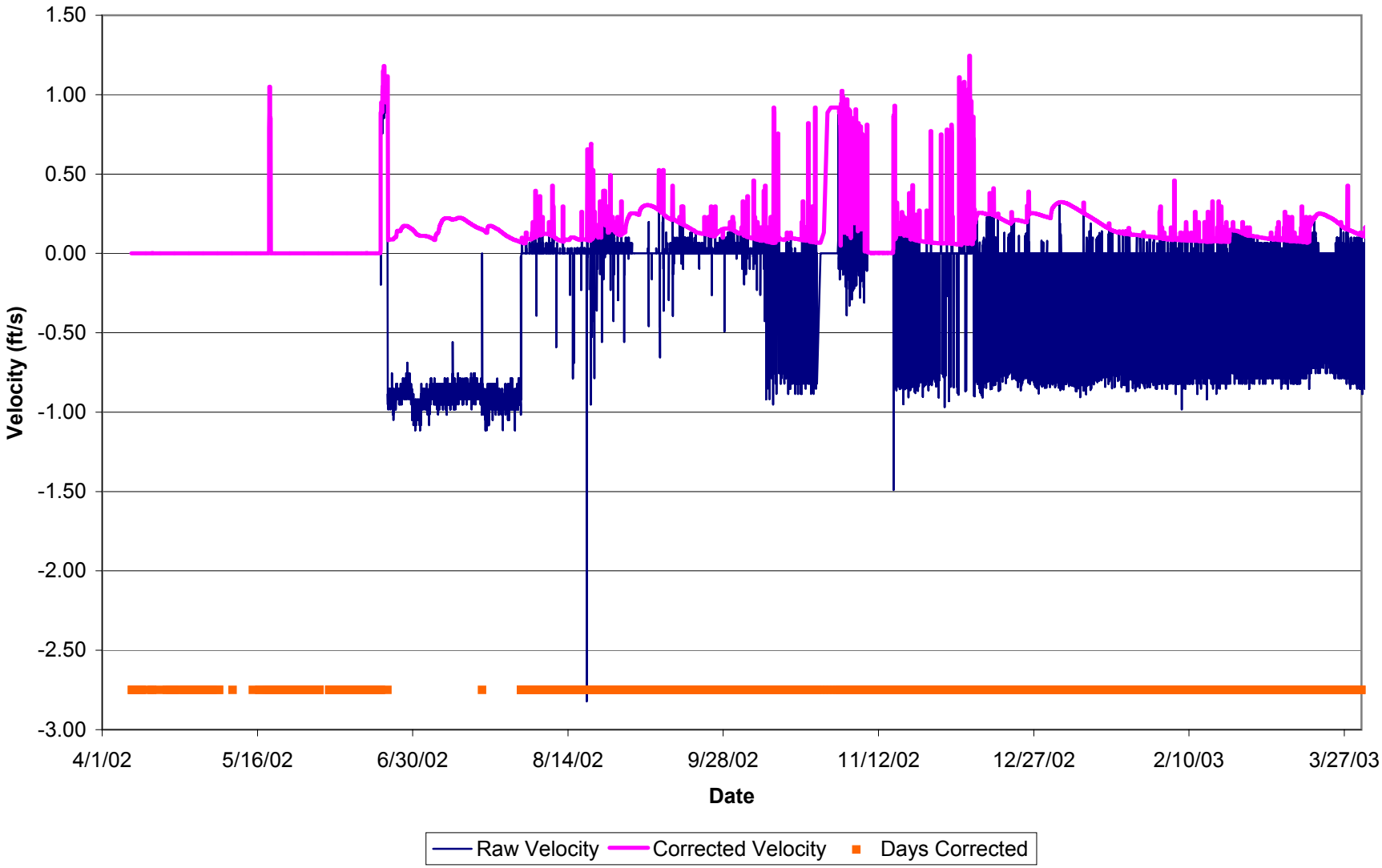


Figure 20. KREA 10D - Flow and P Concentration

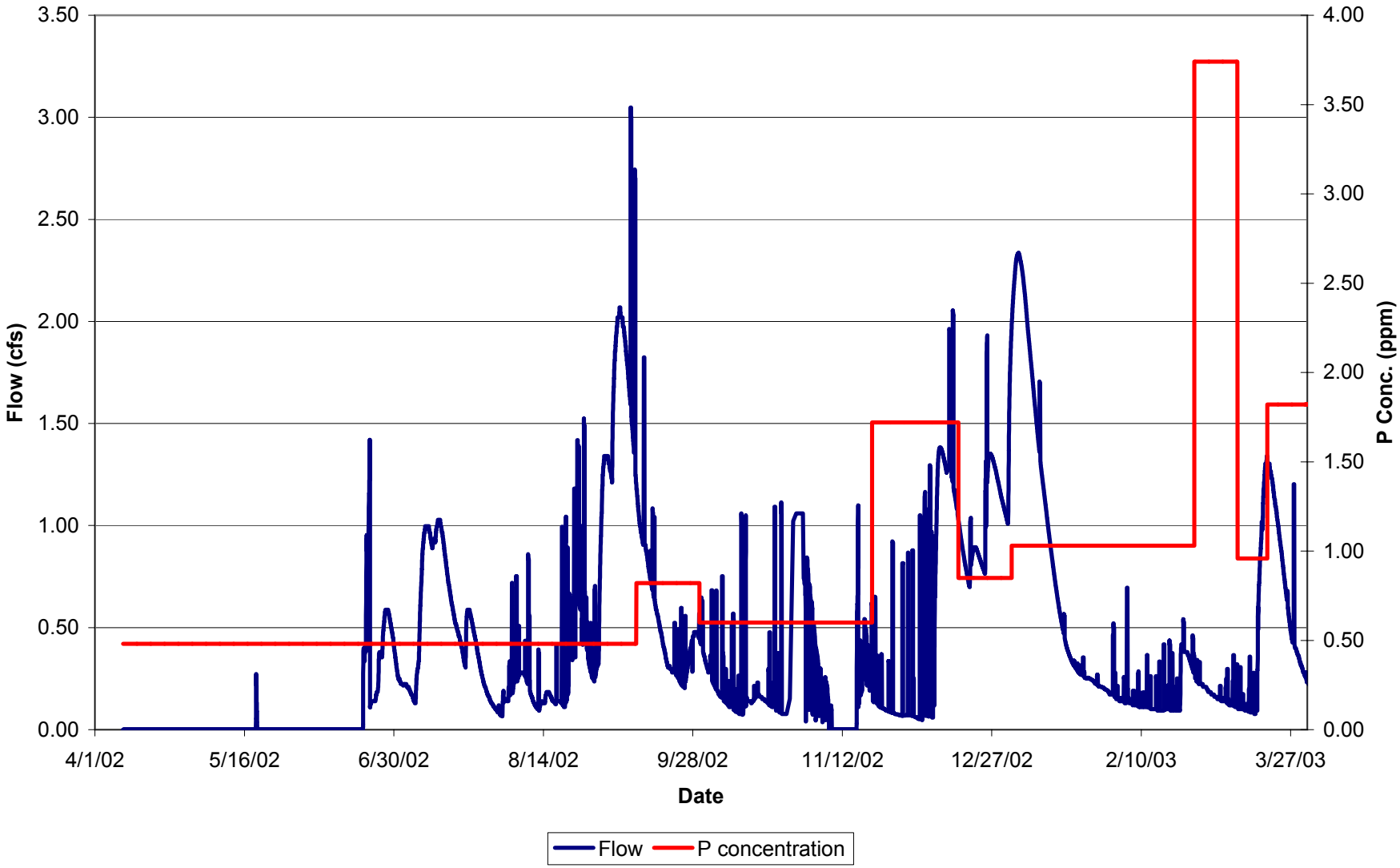


Figure A-21. KREA 32B - Stage

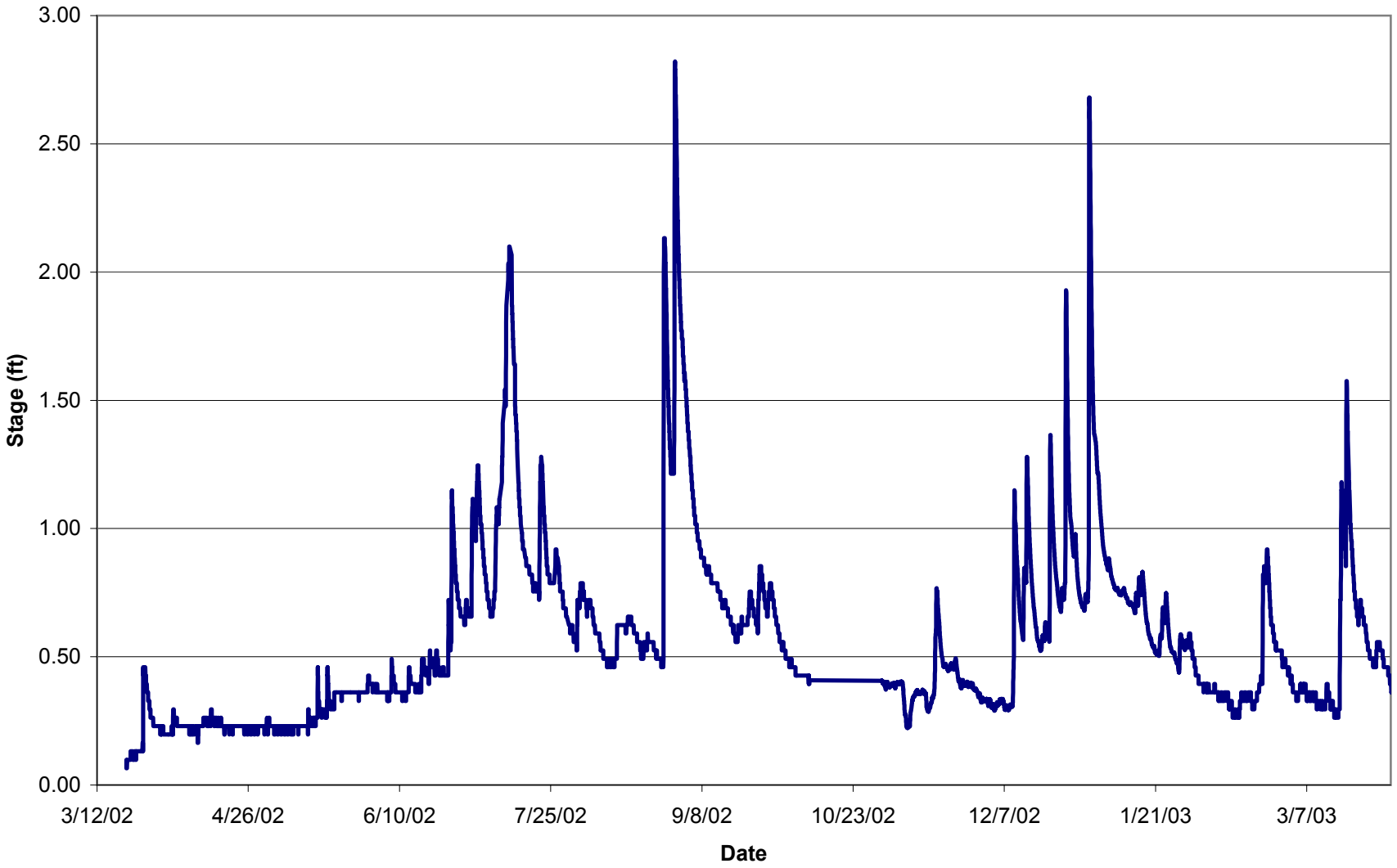


Figure A-22. KREA 32B - Velocity

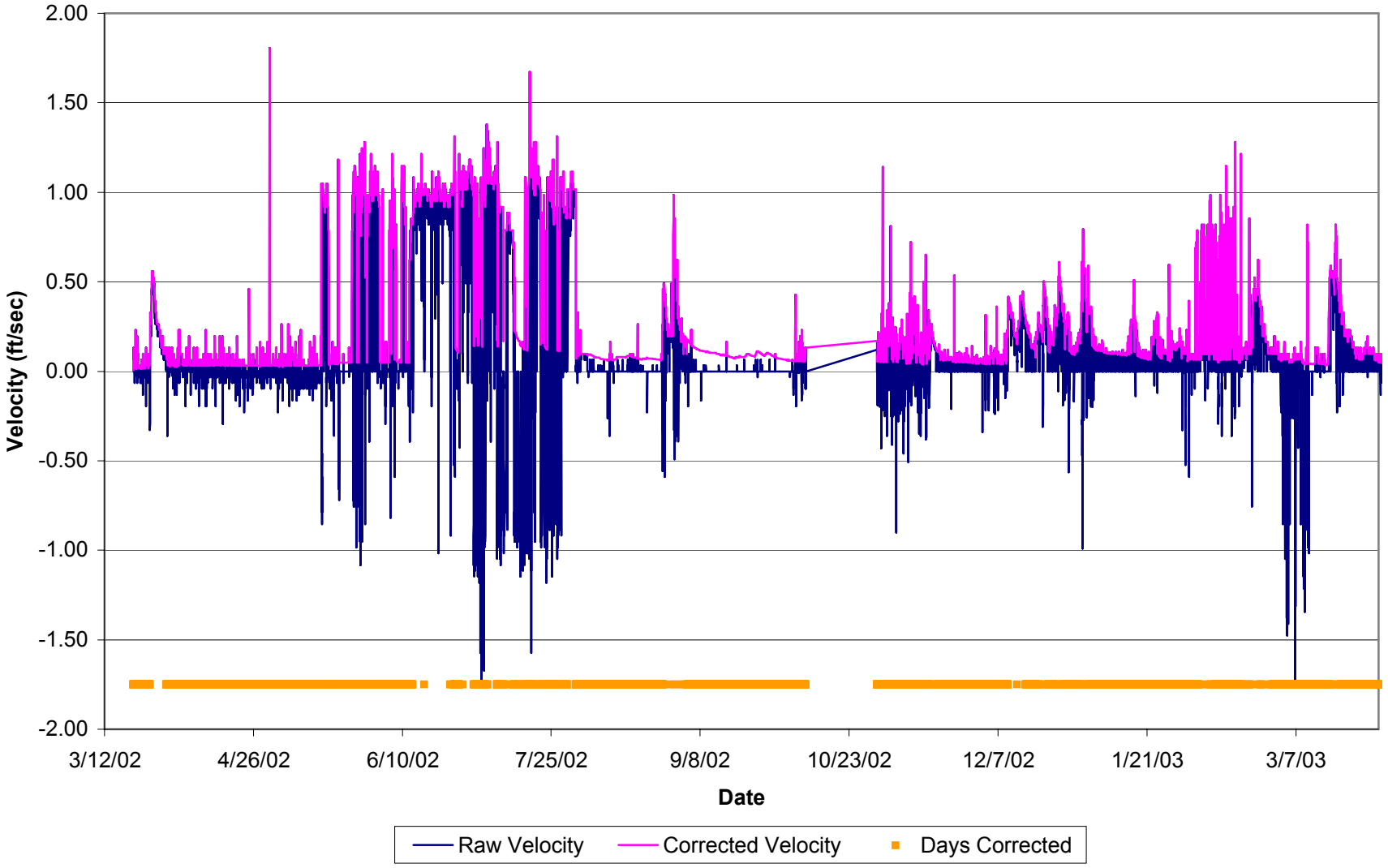


Figure A-23. KREA 32B - Flow and P Concentration

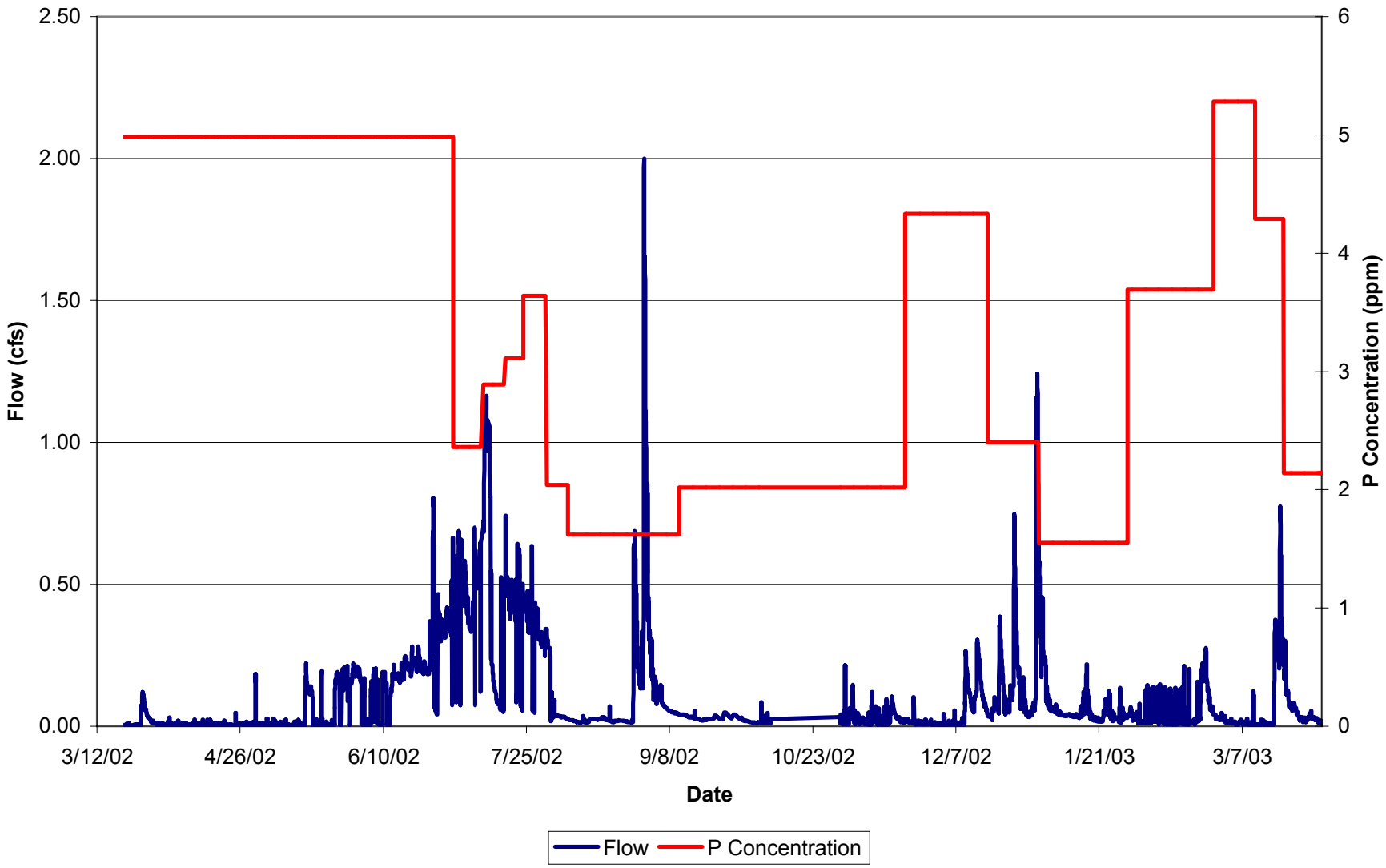


Figure A-24. KREA 49A - Stage

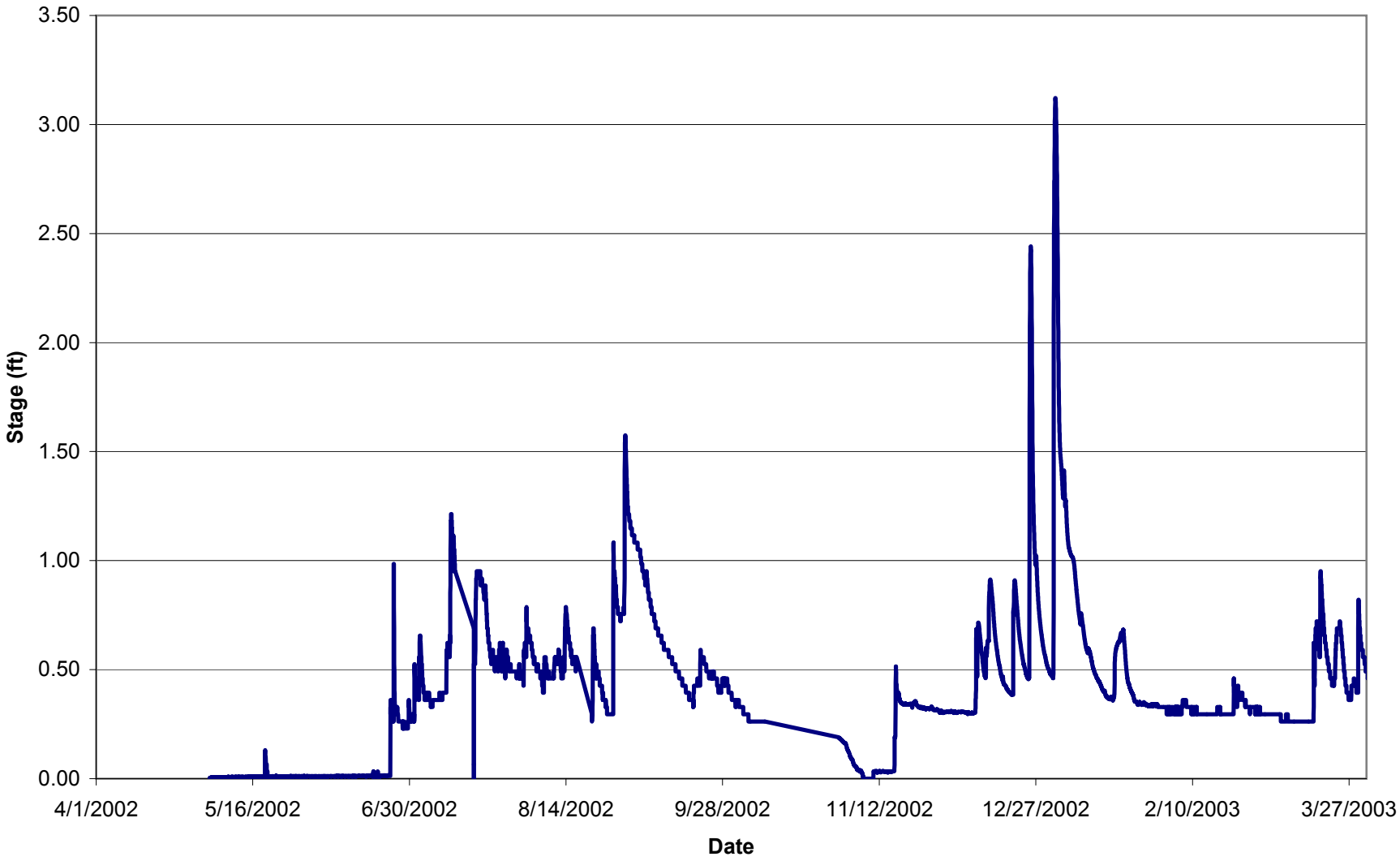


Figure A-25. KREA 49A - Velocity

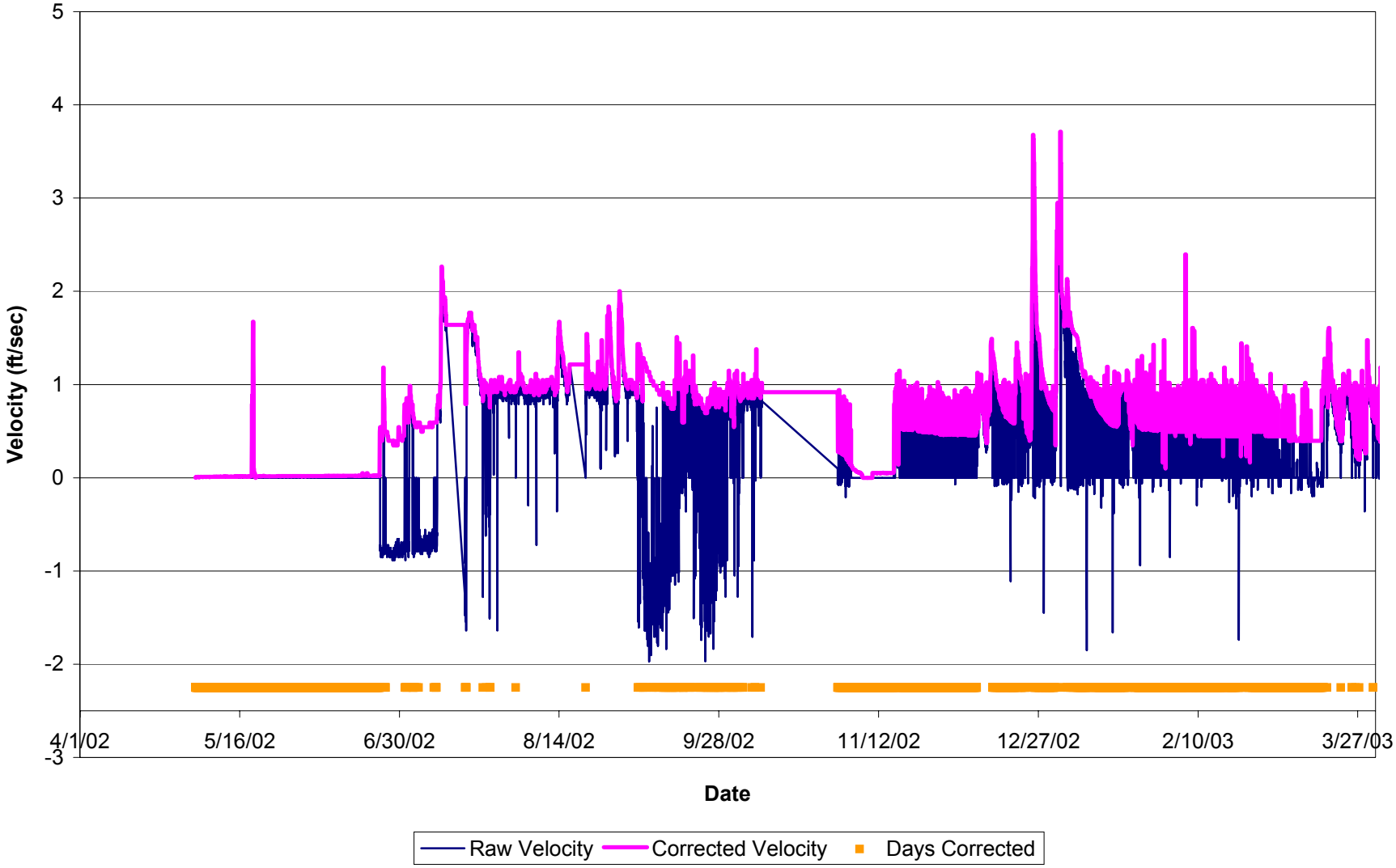


Figure A-26. KREA 49A - Flow and P Concentration

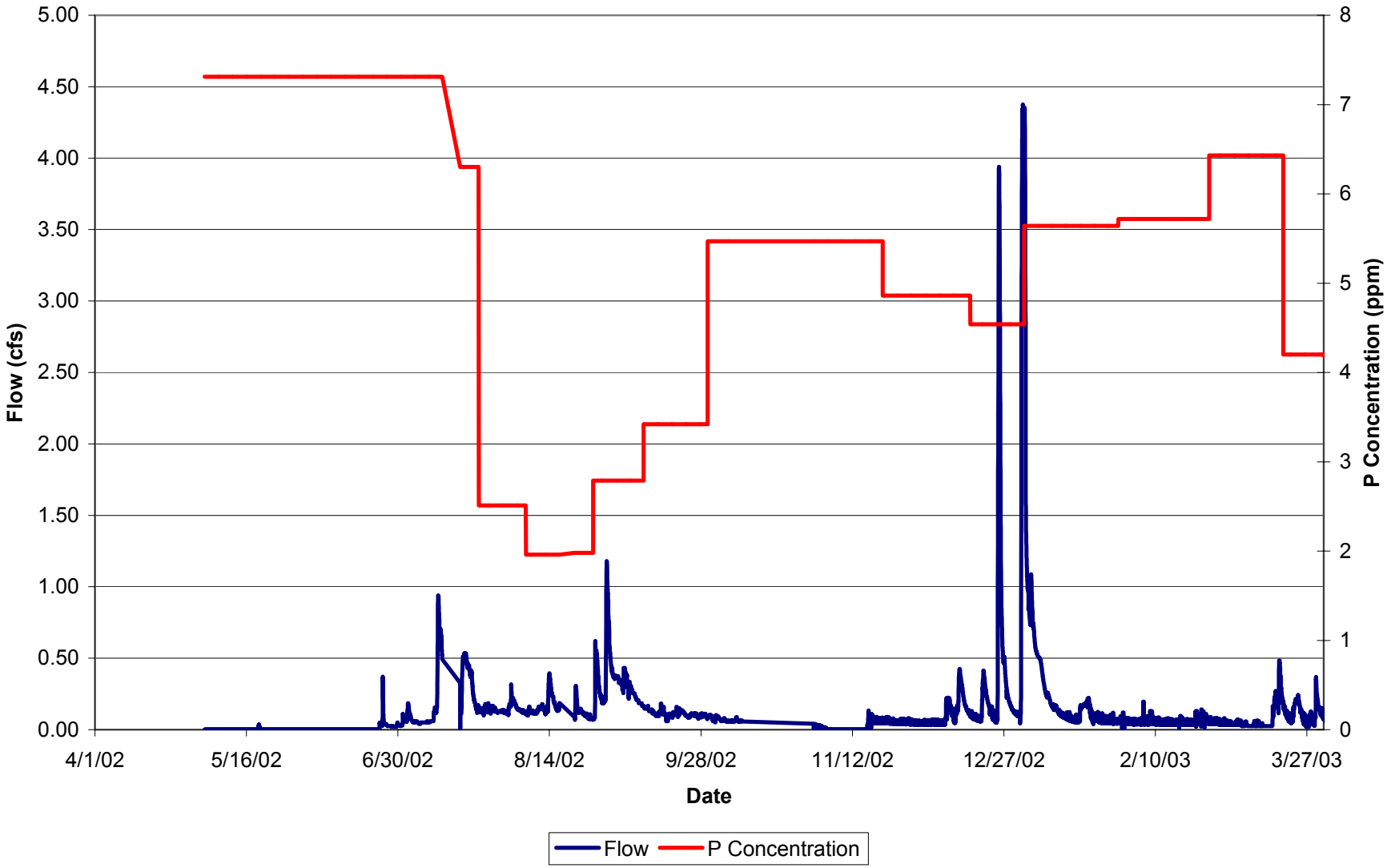


Figure A-27. Total P Concentrations at Monitoring Sites

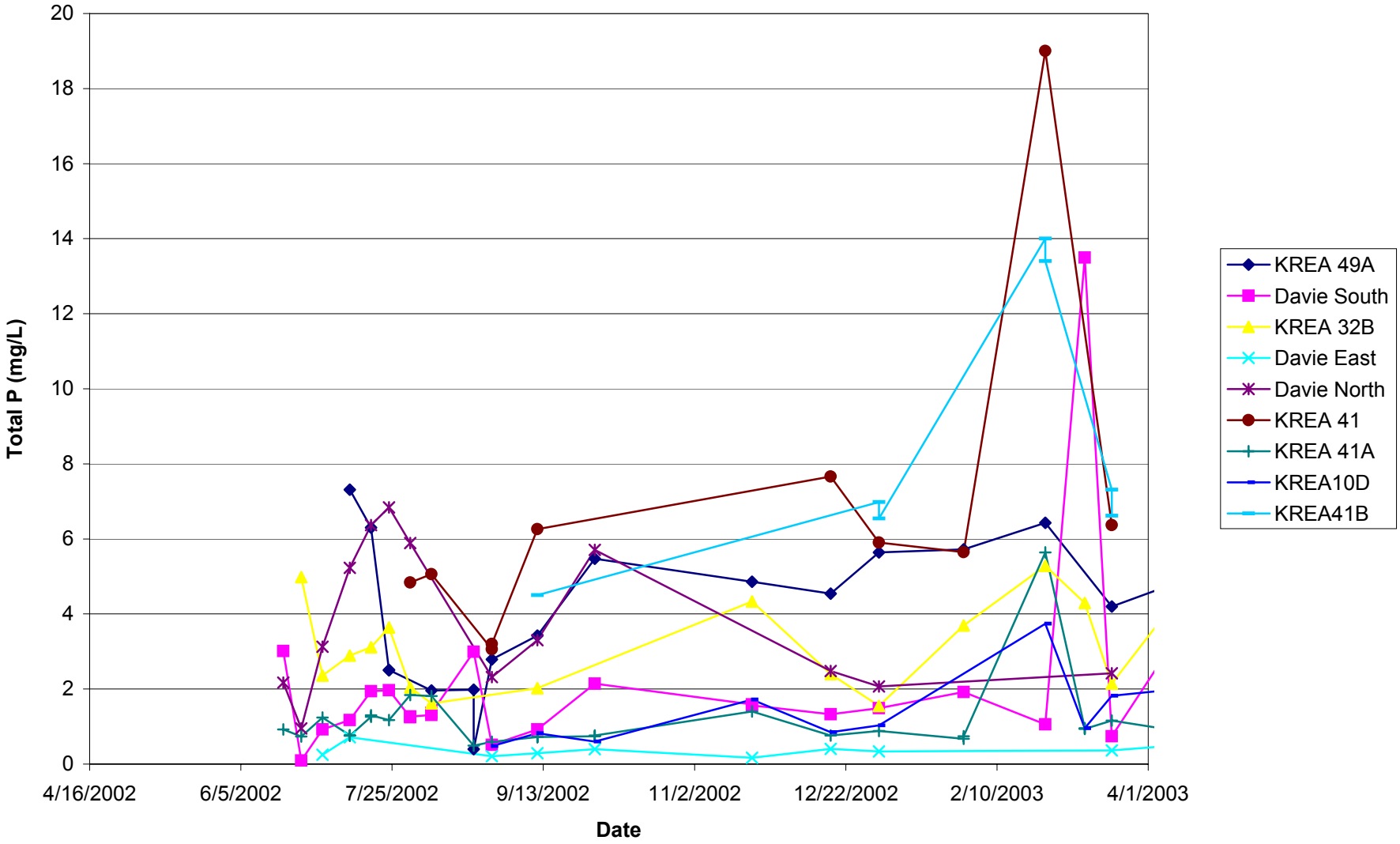


Figure A-28. Fecal Coliform at Monitoring Sites

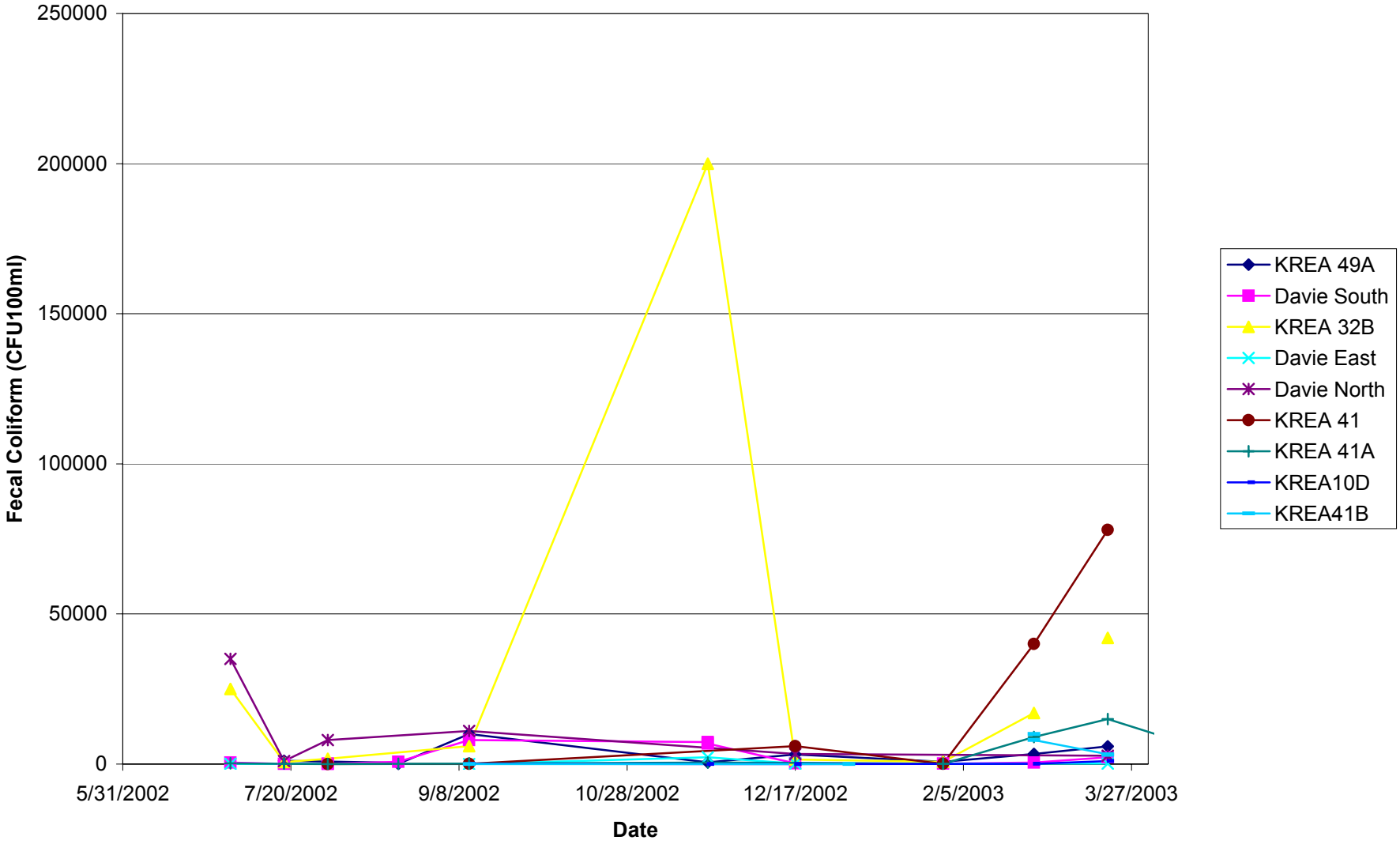
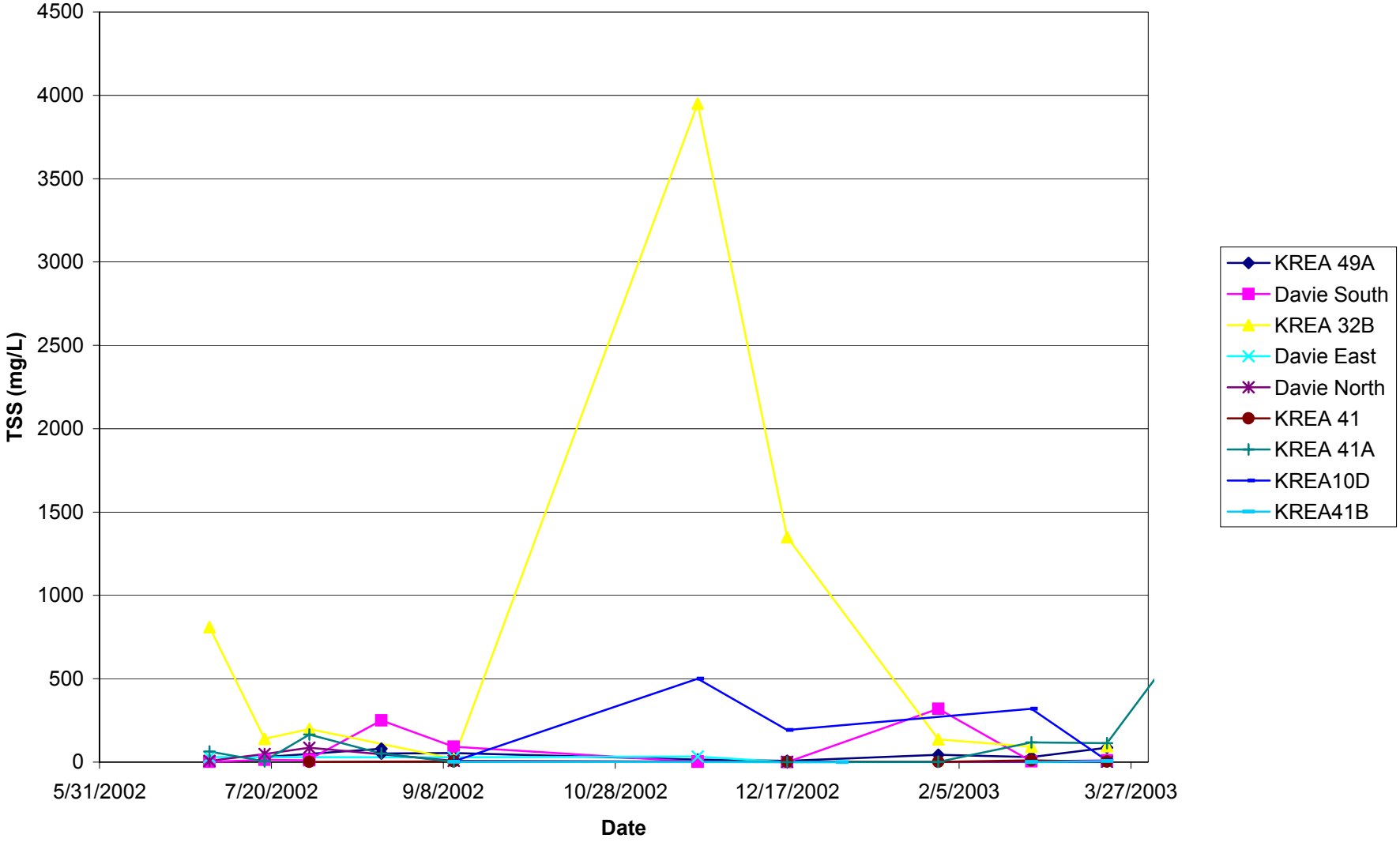
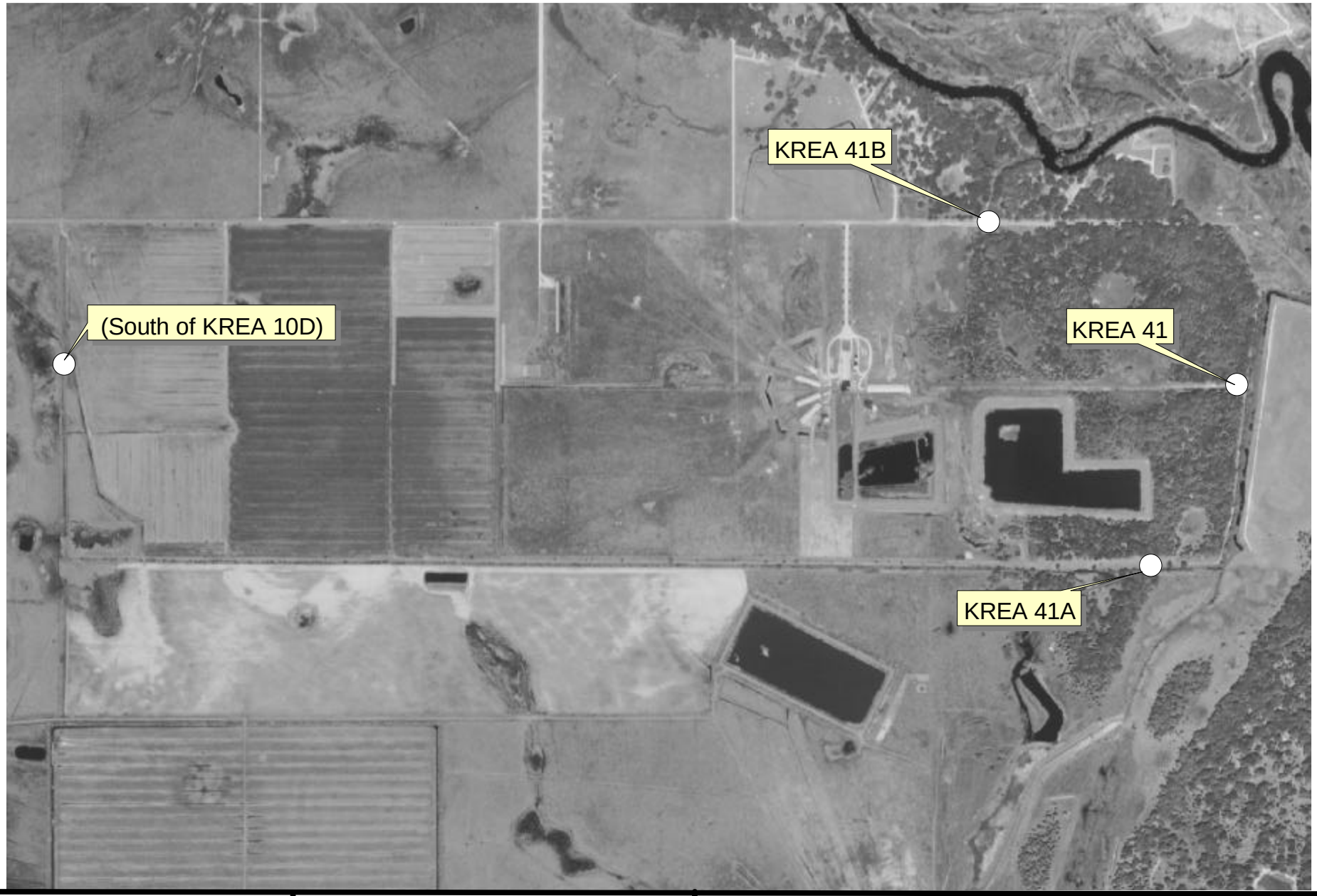


Figure A-29. Total Suspended Solids Concentrations at Monitoring Sites



APPENDIX B

UPDATED SITE MAPS WITH MONITORING LOCATIONS

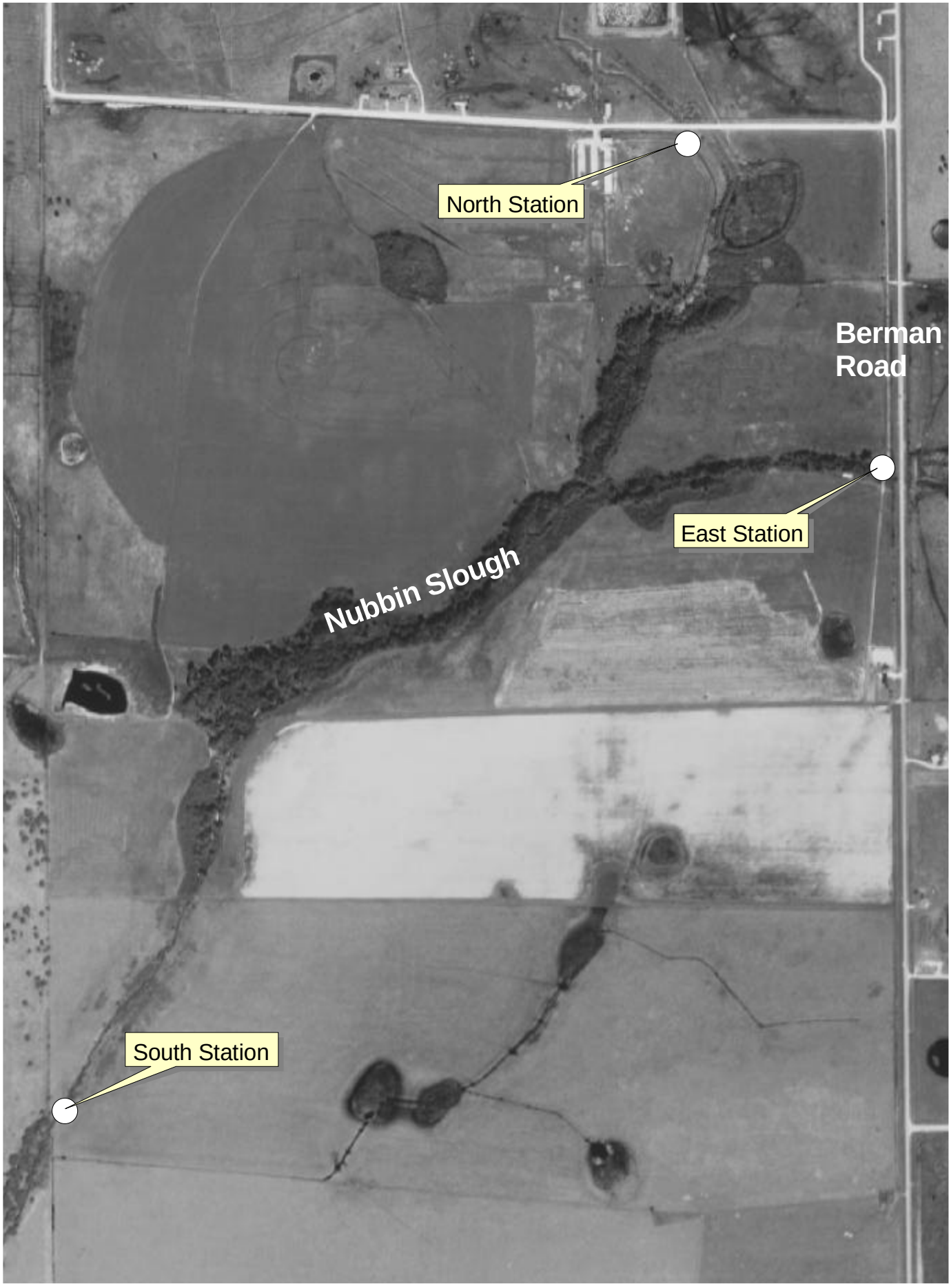


Prepared By
SWET, Inc.

Dairy BAT Monitoring Sites at Butler Oaks Dairy

0.1 0 0.1 0.2 0.3 Miles

N
W E
S



Prepared by SWET, Inc.	Dairy BAT Monitoring Stations at Davie Dairy	0.1 0 0.1 Miles

Prepared by SWET, Inc.	**Dairy BAT Monitoring Sites at Dry Lake Dairy**	**0.2 0 0.2 Miles**

APPENDIX C

SUMMARY OF TRT MEETING ON FEBRUARY 25, 2003

Dairy Best Available Technology Project
Summary - Technical Review Team Meeting 2-25-03

ATTENDEES: See Attached List

FROM: SWET, Inc. and CH2M HILL

DATE: February 27, 2003

Introduction

A Technical Review Team meeting was held at the Lake Okeechobee Service Center in the Fisheating Bay Conference Room on 25 February 2003 from 1:00 pm to approximately 4:30 pm. The primary purposes of the meeting were to:

- Review the status of the project
- Present the construction plans for implementation of Edge of Farm Treatment (EOF)systems at each of the three dairies
- Identify any questions, concerns or issues concerning the construction or operation of the system
- Resolve or make a firm schedule for resolution of all pertinent questions to ensure a timely construction start.

A copy of the meeting agenda provided to all the attendees is attached.

Summary

Del Bottcher began the meeting with a short presentation to review the project status and to stimulate discussion. The presentation focused on a summary of permitting activities and brief presentations of the design drawing for each EOF system.

Permitting has been completed and the agency representatives from SFWMD and FDEP agreed that all necessary approvals to begin construction and operate the system as part of the Dairy BAT project umbrella have been received (but see discussion below concerning the issue of final assurances concerning permitting).

Project construction can start once final approval to proceed is received from the District and from the dairymen.

The discussion focused on the following issues:

1) Permit-related issues

a) Prior to signing written agreements for construction of the EOF system on their farms the dairymen required that written assurance from the involved regulatory agencies that all appropriate permits had been received and that there would be no additional permitting requirements for the project period (December 2004). Part of

this assurance must include concurrence of the NRCS with the project activities so that the dairymen will not in the future discover that the project activities has caused ineligibility for USDA program involvement as currently defined.

b) The dairymen requested that copies of any permits associated with the projects be provided to the NRCS District Conservationist to ensure his understanding of the activities and to provide him a record for future reference concerning the project activities. Written concurrence from the NRCS District Conservationist was also identified as a necessary component of the letter of agreement for construction that the dairymen will sign.

c) The ongoing dairy permit renewal process: An agreement was reached with the FDEP representative that the project activities were not related to the current dairy operating permit renewal process. If the EOF system was selected for permanent use a permit modification would at that time be appropriate.

d) Monitoring responsibilities for the third year of the Army Corps of Engineers Permit? SWET was identified as the responsible party.

e) Long-term monitoring responsibility should the systems be accepted for long-term use by the dairies. The discussion focused on the type of permit that might be required, and the likely requirements. No answer was reached, but the best future was for maintenance of the current permit type, which did not require monitoring.

f) Does the EOF system fall into the NRCS standard practice umbrella? The EOF system has been presented in writing to the NRCS headquarters, where the question is under consideration at this time (response from NRCS). If this is accepted as a standard practice a generic permit for operation should be the result.

g) Awareness by all agencies that the farms are or may be in the 100-year or lower-year floodplains. The agencies are aware, and ensured the dairymen that the project and EOF system use would not be affected by this fact. Kissimmee River Restoration Program does not anticipate any activities in Pool E.

2) Issues concerning the management of the alum residual

i) Alum residual removal/storage options. If the residual were stockpiled, a permit for that activity would be necessary. The current management methods proposed for the residuals to be generated are not considered stockpiling. Land application is acceptable, as this material is not regulated, nor is aluminum content.

ii) Appropriate long term application rates and potential caps or lifetime application limits. There is no known limit on application. However, considering the potential for this material to sequester phosphorus, and other metals, the dairymen using this material should be continuing as in the past to track the soil nutrient and micronutrient/mineral characteristics and maintain awareness of the materials sequestration properties. It may be appropriate to apply sequentially to different areas for maximum benefit to P runoff concentrations and for maintenance of grass health.

iii) Alum residual toxicity to vegetation, particularly pasture grasses. The available literature indicates that there is no known toxicity of this material to vegetation. It has been noted, as discussed above that metal / mineral / nutrient deficiency or suboptimal concentrations may develop with significant applications. No free aluminum toxicity has been found in application tests. Nitrite toxicity from high rate application of some potable water treatment plant (WTR) residuals has been reported, but the stormwater alum residuals being produced by this project should have a different composition than WTR residuals and should have much lower levels of nitrite and nitrate.

iv) Potential toxicity of the residual if ingested by cows. Unknown. It is an area of current investigation. The day after the meeting, this question was presented to researchers in Oklahoma, Arkansas, and Florida, none of who was aware of any published examination of the question, nor of any current research activity. While the common opinion was that it seemed unlikely, the prudent approach would be to exclude cattle from areas where the material was being applied, and to not apply the material on forage production areas. A significant waiting period (months) prior to allowing grazers to use treated areas would ensure that all material was washed off grass and incorporation into the soil had begun.

3) Issues concerning the project contract and activities

a) Termination for convenience clauses. The agreement between the prime contractor, SWET, and the dairymen, covers this issue

b) Ownership of materials at the end of the project. Unknown. Benita Whalen will investigate his question and report back to the group. The dairymen were clear in indicating that that they would like to own the equipment at the end of the project regardless of the outcome. There was also the opinion of some of the TRT members that ownership of the equipment is or should be part of the dairyman's "quid pro quo" for participating in the project.
Post meeting note: *Once the technology has been successfully demonstrated, accepted by the dairymen, and modification of all applicable permits for continued operation have occurred, project materials belong to the dairymen.*

c) Chemical cost and dairyman's responsibility to pay for such costs. The dairymen made clear their strong support for and strong sense of responsibility to this project, but indicated that they have only a finite ability to afford purchase of chemicals. Del Bottcher responded that the project costs were a key issue and that the project would have to adapt if it become clear that costs were moving in a direction that was not supportable. There is no clause that specifically requires the dairymen to pay under any circumstances, but it is also clear that they have an obligation to support the project to best of their ability, and a strong sense of responsibility to do so.

d) Project period O&M support from DACS (response from John Folks). DACS has $300,000 for two years for the three dairies, to be split evenly among them, to support (reimburse) operation and maintenance costs.

e) Removals of materials at end of project (particularly remaining chemical stores). This is a project / prime contractor responsibility.

f) Warranty for system – Equipment is covered by manufacturer warranties or not depending on the particular piece. Each construction firm is bonded for the construction work as required by state statute. Site inspection to ensure appropriate construction will be provided by each particular subcontractor responsible for the construction, and also supported by process of final construction punchlist / acceptance process. The dairyman has the final say on acceptance of the construction product. The issue of inspection frequency was discussed as part of this issue. One vendor responded by indicating that he would be present as often as necessary to ensure that everything was built according to plan. The example was presented that if the construction schedule were 30 days, he would be present every day. If it were six months, he would be present about twice weekly.
Post meeting note: *Inspection issues such as expected frequency of inspection, stop work orders and effects, etc, should be clearly agreed upon in writing (e.g. by letter) by each vendor-dairyman-construction contractor group prior to the start of construction. This is a dairyman-vendor joint responsibility.*

g) Responsibility for repairs necessary through major failures. See f) above. Warranties and the construction bond should cover this potential in many cases. There may be some contingency money that could be applied if appropriate.

h) Real start date for construction: As soon as the dairymen signed the final letter of agreement. That letter will contain the agreement of the regulatory agencies that all required permits have been issued. The date can be the day after the letter is signed by a dairyman.